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BRITISH GUIANA

ANNUAL REPORT

of the

DIRECTOR OF AGRICULTURE

for the year

1961

H.S.P.
R.A.H.
M.M.

COMMONWEALTH MYCOLOGICAL
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SECTION 1

AGRICULTURE IN THE COLONY

General Conditions

The rate of growth of Agriculture was maintained and another satisfactory year was recorded. Although weather conditions were most unsatisfactory, because the year was one of the driest on record, total agricultural output did not suffer as severely as was predicted, at the time, and compared favourably with that of the previous year. That such adverse conditions were overcome, reflected the vigour which has been displayed by local agriculture in recent years.

Exports of sugar rose to a new height, 313,240 tons as compared with 308,992 tons in 1960. However, the value was less ($56,846,260 as compared with $57,539,948) because of the decline of prices in the international sugar market.

Rice exports rose to a new record of 90,236 tons valued $22,623,542 as compared with the previous record of 63,180 tons valued $15,408,349 in 1960. Not only did the country satisfy the total export requirements of the West Indies but it supplied additional markets, notably Cuba to which 29,618 tons valued $7,988,779 were shipped.

Another significant achievement in the export trade, was the increase of exports of shrimp from 2,522,568 lb. valued $1,651,587 to 4,170,200 lb. valued $2,740,997. These exports were in frozen form and were sent mainly to the U.S.A.

Table 1

Export of Major Products

	1960	1961
Sugar	308,992 tons ($57,539,948)	313,240 tons ($56,846,260)
Rum	2,191,372 proof glns. ($3,511,771)	1,817,918 proof glns. ($3,056,796)
Molassess	15,767,056 glns. ($2,705,411)	14,114,592 glns. ($2,698,202)
Rice	63,180 tons ($15,408,349)	90,236 tons ($22,623,542)
Plantains	3,675,499 lb. ($166,519)	3,836,009 lb. ($159,901)
Maize	224,102 lb. ($11,205)	198,078 lb. ($12,618)
Beef	92,638 lb. ($33,112)	38,371, lb. ($15,757)
Cattle	240 head ($40,520)	373 head ($95,250)

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Value of Exports of Agricultural Produce - (F.O.B.) Excluding Ships' Stores/Bunkers.

Commodity	1960 $	1961 $
Live Animals for food	54,234	119,704
Meat and meat preparations	35,353	10,330
Dairy products, eggs and honey	86	747
Fish and fish preparations	1,651,265	2,739,863
Cereal and cereal preparations	15,408,349	22,630,571
Fruits and vegetables	213,034	226,303
Sugar and sugar preparations	60,245,348	59,544,519
Coffee, tea, cocoa, spices and manufactures thereof	270,687	145,672
Feeding stuff for animals (not including unmilled cereals)	320,569	379,698
Miscellaneous food preparations	24,627	29,914
Beverages	3,128,839	3,178,209
Hides, skins and fur skins, undressed and leather	54,861	58,187
Textile fibres not manufactured into yarn, thread or fabrics and waste	380	282
Animal and vegetable crude materials, n.e.s.	3,036	1,387
Animal and vegetable oils (not essential oils), fats, greases, and derivatives	-	288
Chemical Elements and Compounds	- 1	-
Essential Oil - Lime oil and other essential vegetable oils (excluding turpentine) Soaps - soft, resin, hard in bars etc. principally for laundry washing.	584,063	541,003
Miscellaneous Chemical materials and products - starches etc., glue and size dressings, casein, albumen, gelatin, etc.	25,358	16,073
Total Value of Agricultural Produce	82,020,090	89,622,750
As a percent of total Domestic Exports	65.6%	61.2%
Total Value of all Domestic Exports - Excluding Ships' Stores/Bunkers	125,007,900	146,503,296

Table 1 (cont.)

	1960	1961
Hides	396,911 lb. ($42,397)	329,148 lb. ($34,341)
Shrimp	2,522,568 lb. ($1,651,587)	4,170,200 lb. ($2,740,997)
Cacao beans	11,424 lbs. ($4,157)	26,432 lb. ($17,795)
Coffee beans	472,080 lb. ($266,741)	570,528 lb. ($127,867)

Agricultural, livestock and fisheries exports collectively amounted to $89,622,750, the highest figure in history, as compared with $82,020,190 in 1960 and amounting to 61.2% of all exports. Table 11 gives details.

Production of the major agricultural products, for which statistics are available is shown in Table 111 and reflect the extent to which it was affected by the unfavourable (dry) weather conditions:-

Table 111

Production of Major Products.

	1960	1961
Sugar	334,441 tons	324,745 tons
Rice	126,133 tons	124,023 tons
Copra	5,583 tons	6,650 tons
Milk	2,848,000 glns.	3,170,000 glns.
Cattle slaughtered	21,642 lb.	22,448 lb.
Broilers (Major Producers)	1,096,650 lb.	1,262,900 lb.
Shrimp (large)	2,613,300 lb.	3,951,800 lb.

Local food supplies were adequate and prices remained generally at the level of the previous year. Fish prices were lower.

THE POLICY OF THE DEPARTMENT OF AGRICULTURE

The Agricultural policy of Government, as it relates to the work of the Department of Agriculture, continued to be as follows:

(1) to undertake research to improve the productivity of existing crops and livestock and to discover new varieties and types of crops and new breeds of livestock adaptable to the territory. To search for new fishing grounds, to conserve fishery resources, and to adopt new techniques to increase the production of inland and marine fishes;

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(2) to provide educational and extension facilities for all member of the farm family so as to enable the farmer and his family to use research findings and to apply improved techniques and practices on the farm and in the home. To employ similar measures to the fishing industry;

(3) to organise and rationalise production, marketing and processing, particularly on co-operative lines, so as to ensure that the producer obtains the maximum return from his land, and for his labour, and for capital used;

(4) to make available for productive use, after comprehensive soil surveys, increasing areas of land from the large undeveloped land resources of the country;

(5) to provide a climate for prosperity in agriculture and fishing by introducing desirable legislative and administrative measures and by providing necessary facilities, services and materials for efficient production, marketing and processing;

(6) to co-ordinate the above activities with the work of other agencies (e.g. Credit Corporation, Producers' Association, Marketing Boards), and private interests concerned with the development of agricultural resources of the country.

This policy is expected to results in -

(i) an increase of exports of existing crops, livestock and fishery products. For example, sugar, rice, cattle and shrimp;

(ii) diversification of agriculture by production of additional agricultural and fishery products for export and for replacing imports of certain agricultural and fishery products. Examples are Cacao, Coconuts, Dairy Products, Meat, Poultry, Fish and Citrus.

(iii) a reduction of food imports generally by increasing local production of vegetables, root crops, fruit, condiments and legumes.

WEATHER CONDITIONS

The year was much drier than usual and had an adverse affect on Agriculture. The total rainfall for the year at the Georgetown Meteorological Station was 62.96 inches as compared with 83.90 inches in 1960 and the average of 92.20 inches over the past 81 years (1880 - 1900). The rainfall, although below average for ten months of the year - January to May, July and September to December was fairly well distributed except during the months of March and April. April's total of 50 parts was just .02 parts above the lowest ever recorded for that month during the period of recording - 1880 - 1960. The long 'wet season' did not commence until late in May and ended towards the end of August. The

second 'wet Season' commenced earlier than usual at the beginning of November.

Rain fell on 191 days of the year as compared with 204 days in 1960. The highest fall for any one day was 2.75 inches on the 13th June which was well below the record of 7.65 inches on 1st December 1936.

The highest temperature for the year was 89.1°F. on the 11th October and was below the record of 93.0°F on September 22nd, 1955.

CROPS

SUGAR

Organisation of the Industry

Sugar is produced from sugar cane grown mainly on plantations ("estates") owned by two large companies. These companies also operate factories which produce raw sugar for local consumption and for export. Peasant cane farmers cultivate a small quantity of sugar cane for sale to the factories in their vicinity.

The Sugar Plantations are well organised and in addition to employing a large labour force, make full use of mechanical equipment in the field, including the use of aircraft for applying insecticides, weedicides and fertilisers. The aim of the plantations is to provide full employment for a fixed labour force, rather than part time employment for a large number of workers.

The plantations employ a staff of qualified agricultural scientists and other technical personnel and are virtually independent of Government for technical assistance. The Department of Agriculture, while maintaining close contact with the sugar plantations, concentrates its efforts on assisting the small farmers with technical guidance. In addition, the Director of Agriculture serves as Chairman of the Rehabilitation and Price Stabilisation Fund Committee and of the Sugar Experiment Station Committee and the Agricultural Chemist as Chairman of a Committee which determines the price to be paid for farmers' cane by the sugar factories.

Output

The total production of sugar was 324,745 tons as compared with 334,441 tons in 1960. Production on plantations was 319,937 tons and on small farms 6,142 tons as compared with 327,421tons and 7,020 tons respectively in 1960. The average yield of sugar per acre was 3.01 tons as against 3.41 tons in 1960. Adverse weather, mainly dry conditions seriously impaired production and juice quality.

Table 1V shows the production of sugar in the main administrative districts of the country.

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TABLE IV

Sugar and Rum Production in the Administrative districts of Br. Guiana.

1960 - 1961

YEAR	Area reaped (including farmers' canes, English acres).			Sugar Produced (including farmers' canes) tons			Yield per acre - Tons			Rum produced - Proof Gallons		
	Berbice	Demerara	Colony	Berbice	Demerara	Colony	Berbice	Demerara	Colony	Berbice	Demerara	Colony
1960	39,917	58,177	98,094	132,097	202,344	334,441	3.31	3.48	3.41	763,108	2,134,667	2,897,775
1961	43,000	64,840	107,840	123,635	201,110	324,745	2.88	3.10	3.01	481,021	2,309,811	2,790,832

Despite the decision of the Sugar Manufacturers to purchase more canes from farmers, only 108 new acres were brought under cultivation by these suppliers. There are at present only 2,560 acres grown by farmers.

The output of the cane farming industry was about 2% of total production. Nevertheless, it is an important factor in the economy of the East Coast Demerara. The annual value of production there is about $1/2 million. Prices for the year were more favourable than in 1960, the range being from $8.26 to $12.40 compared with $8.39 to $9.76 in the previous year.

Varieties

The choice of sugar cane varieties remained substantially unchanged. B41227 and B37161 were the most popular, accounting for 81.2% of the acreage compared with 78.1% in 1960. The following table shows the position :-

TABLE V

Distribution of Sugar Cane Varieties

Varieties	Percentage of Total Area in the Colony	
	1960 %	1961 %
Co.419	0.7	0.4
B.4098	1.2	0.9
B.37161	36.1	35.3
B.41227	42.0	45.9
B.4362	2.0	1.3
D.37/45	0.4	0.4
B.46378	0.3	0.2
B.47225	3.9	3.7
B.47258	7.2	6.6
B.47379	0.5	0.3
Pindar	2.2	1.5
B.4373	0.2	-
B.45137	0.7	0.7
B.47419	0.2	0.2
B.49119	0.2	0.3
B.4942	0.2	0.2
D.141/46	0.3	0.5
D.158/41	-	0.2
Other Varieties	1.7	1.4

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The Sugar Experiment Station at Sophia, which is maintained by the Sugar Companies, continued to test varieties bred at the Central Sugar Cane Breeding Station in Barbados and to breed and test its own. Two varieties of local breeding D3125/54 and D26/52, having shown their superiority over other varieties were distributed to estates for testing on a larger scale.

Fertilisers

The use of fertilisers continued at about the same level as in the previous year. The quantity actually used was 29,044 tons valued $2,491,102 compared with 31,309 tons valued $2,662,301 in 1961. In addition 15,233 tons of ground limestone valued $318,239 were used compared with 13,377 tons valued $320,238 in 1961. Table VI gives details.

Insect Pest and Disease Control.

The insect pest and disease situation was satisfactory. Control of pests has reached a very efficient level on plantations. No serious damage by the common pests - Diatrea, Castnia, and frophoppers was reported. Rats were kept under control by baiting.

Marketing

Total exports of raw sugar amounted to 313,240 tons valued [illegible], $56,846,260 as compared with 303,992 tons valued $57,539,948 in the previous year. Local sales increased from 19,632 tons to 20,434 tons. The quantity of sugar sold to the United Kingdom, under the Commonwealth Sugar Agreement was 166,367 tons, at the negotiated price of $216.48 per ton c.i.f. compared with 167,724 tons at $213.32 per ton last year. In addition, 80,146 tons were supplied to the U.S.A. at $208.86 per ton. The remainder were sold to Canada and the United Kingdom at world market prices but with the benefit of preferential tariff.

Exports of rum fell from 2,191,372 gallons valued $3,511,771 in 1960 to 1,817,918 gallons valued $3,056,796. However, local sales increased to 521,032 gallons from 509,963 gallons.

Export sales of molasses were 14,114,592 gallons valued $2,698,202 compared with 15,767,056 gallons valued $2,705,411 in 1961.

At year end, the uncertainty of obtaining a quota for export sugar in the U.S.A. was a matter of considerable concern to the industry. Moreover, a world surplus of some 4 million tons, the breakdown of the International Sugar Agreement, and increased competition from protected beet sugar had caused the world price to fall to an unprecedented low level - substantially below the local cost of production. These unfavourable conditions if not solved in the near future, would seriously affect the industry and the large local labour force which depends upon it.

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TABLE VI

Values and Quantities of Fertilisers used on Sugar Estates

1959 - 1961

	Ammonium Sulphate			Superphosphate			Hyperphosphate		
	1959	1960	1961	1959	1960	1961	1959	1960	1961
Quantity - tons	19,800	22,561	20,651	1,171	937	1,208	1,538	3,296	3,166
Value - $	1,801,103	1,828,214	1,666,983	184,690	128,939	182,008	114,585	208,030	207,759
Cost per ton - $	90.96	81.03	80.72	157.72	137.61	150.67	74.50	63.12	65.62
% of Total Quantity	48.4	50.5	46.6	2.9	2.1	2.7	3.8	7.4	7.2
% of Total Value	56.7	61.3	59.3	5.8	4.3	6.5	3.6	7.0	7.4
	Muriate of Potash			Limestone			Urea		
Quantity - tons	3,541	3,649	3,448	13,085	13,377	15,233	1,022	481	357
Value - $	331,977	325,350	325,117	318,954	320,238	318,239	229,132	89,274	66,259
Cost per ton - $	93.75	89.16	94.29	24.38	23.94	20.89	224.20	185.60	185.60
% of Total Quantity	8.6	8.2	7.8	32.0	29.9	34.4	2.5	1.1	0.8
% of Total Value	10.5	10.9	11.6	10.1	10.7	11.3	7.2	3.0	2.4
	Ammonium Phosphate			Basic Slag			Mixed		
Quantity - tons	737	317	164	-	68	50	-	-	-
Value - $	193,831	77,792	40,246	-	3,307.02	2,731	-	-	-
Cost per ton - $	263.00	245.40	245.40	-	54.44	54.62	-	-	-
% of Total Quantity	1.8	0.7	0.4	-	0.1	0.1	-	-	-
% of Total Value	6.1	2.6	1.4	-	0.1	0.1	-	-	-

RICE:

Organisation of the Industry

Rice is the dominant crop of the flat coastal belt, where it thrives on the heavy clay soils. It is grown on a wide range of farms, varying in size from subsistence plots of an acre or two, cultivated on a part time basis by sugar workers and others, to large mechanised holdings of over 1,000 acres. The average size of holdings is about seven acres. On the large Government Land Settlements, the area allotted to each farmer for rice production is 15 acres. The largest rice producer is the British Guiana Rice Development Company (owned by the Government and the Rice Marketing Board) which cultivates 2,600 acres under conditions of complete mechanisation.

In recent years, small farmers have made increasing use of tractors instead of the traditional oxen. Combines have been purchased co-operatively by small farmers and by large operators for harvesting their crops as well as their neighbours' on a contractual hire basis.

About 80% of the paddy is milled into parboiled rice in the districts of production by a multitude of privately owned small mills (some 210). As a result of the recommendations of a committee of which the Director of Agriculture was Chairman, Government accepted the policy that small mills should be improved and loans should be issued by the Credit Corporation for this purpose. As a result about 20 of these mills have now been 'modernised' into multi-stage mills capable of milling both parboiled and white rice and of recovering by-products. There are also two large central mills each capable of processing about 25,000 tons of paddy annually, owned by the British Guiana Rice Development Company. These better mills have helped to improve the quality of milled rice, have given the industry greater flexibility to produce commercial types (e.g. parboiled or white rice), required on foreign markets. Moreover, the by-products which they recover, have enabled a live-stock feed mill to be established and have resulted in greater production of livestock products.

The domestic and export marketing of rice is controlled by the British Guiana Rice Marketing Board, to which all producers are required, by law, to sell their rice. The Board grades, blends, stores and packages this rice and sells it to distributors locally and to overseas.

Production

The total area under rice was 226,300 acres as compared with 195,275 acres in 1960. This acreage was fully cultivated for the main or Autumn crop. Of this amount, 35,049 acres were put under a second or Spring Crop compared with 24,932 acres in the previous year.

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Production was seriously affected by the insufficiency of rainfall and irrigation . In some areas, rain fell at harvest, thereby reducing both yield and quality. The total yield for the year was 124,023 tons compared with 126,133 tons in 1960. The Autumn crop produced 111,598 tons and the Spring Crop 12,425 tons. Comparable figures for 1960 are 115,560 tons and 10,573 tons respectively.

The returns for the main administrative districts are shown in the table below. The notable feature of this table is the marked increase in Berbice where expansion occurred mainly in Black Bush Polder, Moleson Creek, Jackson Creek and on the banks of the Abary River.

TABLE VII

Rice Acreage and Yield, British Guiana

1960 - 1961

YEAR	Total Estimated acres - Spring and Autumn Crops				Estimated Yield Tons of Rice
	Berbice	Demerara	Essequibo	Total	
1960	90,210	89,832	40,165	220,207	126,133
1961	120,740	95,250	45,359	261,349	124,023

The quality of the crop was generally unsatisfactory. The paddy bug (Mormaidea poecila) was the cause of severe reduction of yield and of quality in many areas. In the more humid districts and on new land, blast disease (Piricularia oryzae) was particularly serious. Some of the loss which occurred was avoidable. Farmers can do much more to protect their crops; the most important need is that they should exercise vigilance and adopt the recommended measures of control as soon as pests and diseases are observed. Many farmers live far away from their holdings; in some cases as much as from 10 to 20 miles. In these circumstances, the farmer is on his land only for the purpose of sowing and harvesting. Since good husbandry and the control of pests and diseases require the presence of the farmer on his cultivation daily, absentee rice farming is bound to be wasteful and there can be little hope for a highly efficient industry, as long as this custom prevails.

The Director of Agriculture submitted a Scheme for improving efficiency in the industry. This Scheme, subsequently publicised as "the KENNARD PLAN" proposed a country wide programme for the control of pests and

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diseases including spraying by aircraft, and for the cost to be met by a cess on rice sold to the Rice Marketing Board. Other proposals included the provision of fertilisers on credit, the erection of dryers, increased production of pure seed, legislation to penalise certain bad husbandry practices, educational campaigns in co-operation with the Rice Producers' Association, establishment of new standards and price structures for rice sold to the Board and other related matters.

Mechanisation of the industry continued to move forward. Imports of tractors amounted to 783 valued $2,304,299 and of combine harvesters 55 valued $744,583. In 1960, 777 tractors valued $2,229,454 and 128 combines valued $1,188,665 were imported.

The varietal position remained unchanged. No. 79 and D. 110 are the dominant varieties. The new varieties, bred by the Department, No. 60/44 and 60/47 gave good results on extensive trials on farmers land throughout the colony.

Marketing

The marketing of rice is the statutory responsibility of the British Guiana Rice Marketing Board which purchases all rice from farmers and millers for local distribution and for export. The Rice Marketing Ordinance was amended in August1960 to provide a greater measure of representation for rice producers on the Board. The Board comprises sixteen (16) members, at present, as follows:-

(a) two officers in the Public Service (at present the Director of Agriculture and the Permanent Secretary of the Ministry of Trade).

(b) Twelve persons, appointed as follows:-

(i) eight rice producers nominated by the Council of the Rice Producers' Association from among its members.

(ii) three rice producers who are manufacturers nominated by the Council of the Rice Producers' Association;

(iii) one person nominated by the British Guiana Rice Development Company, Limited.

(c) Two other persons experienced in marketing.

The Chairman and Vice-Chairman of the Board are elected by its members. There is an Executive Committee consisting of the Chairman, the Vice-Chairman and four (4) members elected by the Board.

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Prices

Prices paid by the Board for rice were as follows:-

Grade ...	Price per bag of 180 lbs. $
Extra Super	20.70
Super	19.70
Extra No. 1	18.55
No. 1	17.60
Extra No. 2	16.45
No. 2	15.35
No. 3	13.20
Super Broken	9.85
Broken	8.20
Unclassified	7.00
White A	19.70
White B	17.60
White C	15.35
White Broken	10.00

Local selling prices were:-

Local Selling Prices 1961	$	
Super	22.15	Per bag of 180 lbs.
Brown A	18.80	- do -
Brown B	14.45	- do -
White A	21.30	- do -
White B	18.80	- do -
White C	17.00	- do -
Brewers Broken	12.00	- do -
Mixed Broken	10.45	- do -
Stock Feed	7.20	- do -
"Pearl Brand"	10.00	Per 60 lb. cartoon net
"Indian Maid	7.73	Per paper sack 50 lb. net

The Board continued to be the agency for the execution of the contract for the sale of rice between the Government of British Guiana and Federation of the West Indies. This contract was not extended by the West Indies beyond the year 1963 which was previously agreed. In addition, prices at which rice is supplied remained unchanged, as follows:-

Super - $21.30 per bag of 180 lb. f.o.b.

1st Quality - $19.20 per bag of 180 lb. f.o.b.

2nd Quality - $16.95 per bag of 180 lb. f.o.b.

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An important contract was negotiated with Cuba for the supply of White rice and a special quality of parboiled rice. The quantity involved was 35,000 tons more or less annually and the period of supply was fixed at 5 years. The prices for shipments during the first year (1961) were:

Super	. . .	$24.07 per bag of 180 lb. f.o.b.	
1st Quality	. . .	21.58	- do -
White B	. . .	23.00	- do -
White D	. . .	19.58	- do -
White No. 2	. . .	20.58	- do -
White No. 3.	. . .	19.28	- do -

The quantity of rice exported for the year was a record; being 90,236 tons valued $22,623,542 compared with 53,180 tons valued $15,408,349 in 1960; of this quantity, 29,618 tons valued $7,988,779 were shipped to Cuba and 56,569 tons valued $14,118,890 to the West Indies.

The Board brought into operation its new processing plant, capable of handling 12,000 tons of rice. The plant incorporates machinery for remilling, blending and packaging rice and for the removal of discoloured and unwanted grains. It is claimed to be the most efficient of its kind in the world.

The Board also added to its storage facilities by completing large bonds at Springlands on the Corentyne.

British Guiana Rice Producers' Association

This Association represents the rice producers of the Colony. It elects and selects the majority of members of the Marketing Board, engages in educational activities intended to improve the efficiency of rice production and promotes and defends the interests of the industry generally. The Association was quite active during the year and worked closely with the Department of Agriculture in the field. The Director of Agriculture (or his nominee) served as a member of the Association.

The British Guiana Rice Development Company Limited

This Company operates with an issued share capital of $2,000,000 and capital debentures of $5,001,600 in favour of the Colonial Development Corporation. The Company is owned by the Government of British Guiana with the Rice Marketing Board as a minority shareholder. The work of the Company is concerned with the operation of two modern rice mills, and the mechanised production of rice on 2,600 acres of land at Burma.

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The Company purchased the record quantity of 600,614 bags of paddy as follows:

Mahaicony -Abary

(a)	From the Company's Farm	27,287
(b)	From farmers	396,564
		423,851

Anna Regina

(a)	From Farmers	176,763
		600,614 bags

In addition, it bought from farmers, on behalf of Government 71,832 bags of paddy part of which was later exported to Cuba.

The Company installed additional driers at Mahaicony-Abary and at Anna Regina to cope with the increased intake of paddy. It also embarked on a programme to diversify its agricultural operations by increasing its herd of beef cattle and sheep and starting a piggery.

COCONUTS

Organisation:

Coconut is the third most important crop in the colony and there are approximately 35,300 acres grown on estates and in scattered plantings in villages and along the sides of drainage and irrigation canals. At present, the total output of copra is used locally to produce cooking oil, soap, margarine and compound lard for the home market.

Output:

Under the 1960-1964 Development programme, a campaign was launched to increase the production of coconuts to satisfy the full requirements of the local industrial and consumer market. An annual target of 1,000 acres of new or replanted cultivations was set initially, but having been surpassed early in the programme, it was revised upwards to 2,000 acres. This acreage has since been surpassed. For example, during 1961, the Department of Agriculture distributed 128,000 selected seedlings which (after making due allowance for wastage) would supply 2,500 acres.

The total production of crude and refined coconut oil in 1961 was 975,535 gallons as compared with 744,700 gallons in 1960. The total output of copra was 6,650 tons as compared with 5,583 tons in 1960. This led to

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increased output of copra meal, edible oil and margarine and lard compound. Soap production fell sharply as a result of competition from imported soaps and detergents.

The following table sets out details of output of coconut products for the past five years:-

TABLE VIII

OUTPUT OF COCONUT PRODUCTS

Year	Copra (tons)	Copra Meal (lbs.)	Edible Oil (glns).	Crude Oil (glns.)	Soap lb.	Margarine Compound Lard
1957	5,370	3,814,412	676,731	147,339	4,777,727	1,642,230
1958	4,832	3,432,358	623,835	109,729	4,012,976	1,920,978
1959	3,432	2,440,165	445,350	86,282	3,748,514	1,778,550
1960	5,583	3,705,045	681,545	63,191	4,094,011	1,845,633
1961	6,650	4,699,815	924,575	50,960	3,995,232	1,896,929

Marketing

Prices of coconut products are controlled by the Commodity Control Organisation and the wholesale prices of deodorised coconut oil remained the same as in 1960 i.e. $2.48 per gallon. Copra prices were also unchanged, although the lowest grade was more severely penalised. The range of copra prices was $302.40 per ton for Grade 1 and $263.20 for Grade III delivered to mill.

Apart from price control, there is free trade in copra and its derivatives on the local market.

The colony continued to participate in the British Caribbean Oils and Fats Agreement. The new agreement, ratified from 7th January 1959, continued in force. The area export prices for copra was increased to £70.16s.6d. per ton f.o.b. and raw oil to $2.53 per gallon f.o.b. during the year.

Conditions within the Industry:

Despite dry weather conditions, coconut orchards were reasonably well maintained. The important pests continue to be the caterpillar (Brassolis sophorae) and the moth borer (Castnia daedelus). Brassolis attacks were particularly severe around urban centres e.g. Georgetown and New Amsterdam where it appears that biological control is negligible. On the larger

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estates, it has been found profitable to control Castnia by periodic spraying with a 1% solution of Dieldrin.

Red Ring disease caused by the nematode Rhadinaphelenchus cocophilus was discovered at Moruca in the North West District and at Lochaber. Steps were taken to prevent the spread of the disease following a study of the situation by Dr. F.W. Fenwick of the Trinidad Coconut Research Organisation.

COFFEE (var. liberica)

Coffee producers had a worse year than in 1960, as local and export prices for their coffee fell below the average cost of production. Prices received by farmers fell from 32 cents per lb. in 1960 to 18 cents per lb. in 1961. The future of this industry is very much in doubt unless Government intervenes with a suitable marketing scheme to protect farmers.

Weather conditions were more favourable for harvesting than the previous year. And the dry conditions reduced damage by Sclerotium disease.

The Department of Agriculture in colaboration with the Tropical Products Institute in the United Kingdom completed investigations into the technique of making instant coffee from the local variety. It appears that manufacture of this product is not only technically feasible but it might well be a means of improving the economic position of farmers.

Exports of coffee increased in quantity - 570,528 lb. as compared with 472,080 lb. in 1960 - but fell in value from $256,741 to $127,867, reflecting the depressed state of overseas market prices.

The total acreage under coffee remained at about the 1960 level of 2,800 acres with an estimated yield of about 1,000,000 lb; a half of which is consumed locally.

CACAO

Very little interest was again shown by farmers in this crop because of continued low market prices and predictions that this state of affairs would continue for many years. Nevertheless, the Department of Agriculture continued to press on with its programme of encouraging production and some 70,833 plants were distributed. This quantity was sufficient for the planting of about 200 acres and exceeded the previous year's distribution by some 20,000.

CITRUS

Farmers continue to show good interest in the cultivation of oranges and grapefruit. The Department of Agriculture distributed 34,112 plants which would enable cultivation of almost 500 acres. The number of plants distributed exceeded the previous year's total by 14,000. Allowing for production

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of plants by private nurseries (mainly limes), it is estimated that about 700 acres were planted or replanted in orange, grapefruit and limes. The local market was glutted with fruit for about a month during the year, and prices slumped to an unprofitable level. There is need for improved marketing of citrus for the local market. Better storage, packing, grading and merchandising are also required. Processing to produce canned juice for the local market and either concentrated or frozen juice for export will be required by 1964.

Food Crops:

Good supplies of plantains and root crops were available throughout the year and prices continued at about the level of the previous year. However, serious gluts did not occur as in 1960.

A development of much interest was the initiation of an export trade in pumpkins, eddoes and yams to the United States of America. Exports of plantains continued to the West Indies and 3,836,009 lb. were shipped as compared with 3,675,499 lb. in 1960.

Corn production showed a moderate rise but there is considerable scope for expansion in order to supply the annual requirement of 6,000 tons of the new livestock feed manufacturing company. The Marketing Division met all the needs of the country for corn meal and produced 359,000 lb.

In order to diversify food production, considerable emphasis was devoted by the Department of Agriculture to increased production of legumes. Farmers expanded their cultivation of blackeye peas and pigeon peas; the dried decorticated split pea of the latter is called Arhar dhall. Although, bonus payments were made on 180 acres of these crops only, the total new acreage was estimated at 500.

Peanuts and cabbage were other crops which received much attention and to which farmers responded.

Prices, generally, for tropical food crops were the lowest for territories in this area and supplies most abundant. A wide range of tropical fruits - bananas, pineapples, mangoes, papaw was always available in local markets.

BEEKEEPING

The usual slow progress was made. The number of colonies increased from 2,110 to 2,171. Output of honey was estimated at 114,000 lb. as compared with 110,000 lb. in 1960, with bees wax at the same level (2,000 lb.) as last year.

The local market was fully supplied by local production but costs of production remained too high and the scale of operation too small for the development of an export trade.

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LIVESTOCK

Milk:

Dairying is encouraged on the coastal belt in the environs of towns and other large centres of population. Production is organised as supplementary to rice, coconut or sugar monoculture. However, there are a few large and many small specialised dairy farms and the policy is to encourage this system of production. With respect to breed, local cattle have a basis of the 'creole' breed, a degenerate mixture of many breeds-top crossed with the Holstein breed. The improved Holstein/Creole is an adaptable animal giving a satisfactory yield of milk under good management.

Most dairy cattle are fed on cut fodder - largely para grass, supplemented by grazing on unimproved pastures.

The estimated output of milk for the year was 3,170,000 gallons compared with 2,848,000 gallons in 1960. The Milk Pasteurisation Plant operated by the Marketing Department, which serves the city of Georgetown purchased 692,803 gallons compared with 622, 262 gallons in 1960.

Prices paid for Milk by the Plant were:-

Leguan and West Demerara	. . .	72 cents per gallon
Cane Grove	. . .	86 - do -
West Coast Berbice	. . .	60 - do -
East Coast Berbice	. . .	70 - do -
Georgetown	. . .	80 - do -
Grade A, T.B. Tested	. . .	96 - do -

Bottled pasteurised milk was sold at $1.08 per gallon wholesale and 16 cents per pint retail.

The programme to improve dairy cattle emphasized the use of artificial insemination. The number of services given by the Department of Agriculture was 2,974. In addition, it was decided to test the effect of establishing pure bred herds under very intensive management in order to bring about a more rapid increase in the milk supply. In this connection, 184 Holstein/Friesian and 6 Brown Swiss Heifer calves were imported. Some of these have already been bred with semen from tested Holstein bulls selected in Louisiana, both for production and heat tolerance.

Other aspects of the dairy cattle improvement programme were clean milk production, the cultivation of fodder for which an incentive bonus is offered, and general improvement of methods of husbandry through teaching and advice from the Extension Service and members of the Animal Husbandry Division.

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Beef

Specialised beef production is concentrated in the Rupununi savannahs of over 4,000 square miles. On the coastal plain, there are a few ranches. In addition, a large number of farmers and land owners keep cattle to provide themselves with milk, to produce oxen and to sell to butchers those animals in excess of their needs or which are unsuitable or too old for the production of milk or power.

The industry in the Rupununi was seriously affected by a widespread outbreak of Foot and Mouth disease which necessitated the imposition of a ban on export to the coast. Widespread vaccination brought the disease under control.

The programme of improvement for the industry emphasizes, firstly, the opening up of new areas of production e.g. the Intermediate Savannahs, and the Coastal backlands. The Intermediate savannahs are mineral deficient and the coastal backlands suffer from annual flooding. These problems are being tackled. The Ebini Research Station in the Intermediate savannahs has worked out the techniques required for efficient grass production, using fertilisers and palatable high yielding grasses such as pangola. Water Control Schemes are being implemented or are planned for the coastal backlands.

The second aspect of improvement is the grading up of local herds using pure bred Zebu and Santa Gertrudis bulls and, where management is of a good standard, to encourage pure bred herds. Better control of pastures by fencing, control of burning and regulation of stocking are advocated. Finally, control of diseases such as rabies by regular vaccination is an important aspect of the official policy.

Slaughterings for the year amounted to 22,448 head as compared with 21,642 head in 1960. 329,148 lb. of wet salted hides and 373 head cattle were exported as compared with 396,911 lb. and 240 head respectively.

Pigs:

There was an increase in pig production which was accounted for largely by the improved supply of local feeding stuffs, notably broken rice and copra meal. In addition, pure bred breeding stock from the Department of Agriculture and from private breeders, such as the Demerara Bauxite Company and the Mazaruni Prisons, was more readily available. The supply of pork exceeded the local demand. Producers were discouraged by the dis-organised state of the market. However, the Marketing Department has since imposed a prohibition on imports of bacon and some types of ham and has increased its production of these products. This should help to ease the plight of producers.

The official improvement policy is to encourage the rearing of large whites under intensive management.

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Poultry

Specialised production of broilers continued to increase, Output from the large commercial producers was 1,262,900 lb. compared with 1,096,650 lb. in 1960.

Hatcheries producing broiler chicks, had a good year. In addition to meeting practically all local requirements, it was possible to export 51,300 baby chicks to Surinam and Trinidad. A small export of 2,600 lb. of poultry meat was made to Trinidad.

The output of eggswas fair but there is room for expansion.

A local company commenced production of livestock feeds using local ingredients supplemented by imported concentrates (protein, minerals and vitamins) and corn. By year end, most of the large poultry producers were obtaining their supplies of feed from this source.

ANIMAL HEALTH

Foot and Mouth Disease of cattle in the Rupununi was widespread and some 20,000 head of cattle were vaccinated using a bivalent OA inactivated vaccine. About 4,000 cattle were also vaccinated with a live virus vaccine prepared by the Pan Aftosa Centre in Rio de Janeiro. The disease was reported in August. but the vigorous vaccination programme which embraced the whole cattle population of the Rupununi brought it under control. At year end there were no new reports of the disease for a period of 10 weeks and this is the position at present.

Paralytic Rabies. This continued to be a serious problem. Outbreaks on the Demerara river and the Essequibo Coast were controlled by vaccination. In the Rupununi, ranchers themselves vaccinate against the disease but the Department of Agriculture undertakes regular vaccination, particularly of cattle owned by Amerindians.

Brucellosis: This has become a serious condition on the coast, particularly on farms in the environs of Georgetown. A programme of vaccination, using a strain 19 vaccine, was begun but lack of staff is hindering full implementation of the programme.

Swine Erysipelas: Serious damage was suffered by some herds. Vaccination at intervals of 6 months has now been introduced.

New Castle Disease and fowl pox: Sporadic outbreaks were effectively controlled by vaccination.

Chronic respiratory disease of poultry: This disease became quite troublesome as a result of overcrowding in pens. Use of antibiotics and better husbandry practices helped to bring it under control

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Salmenellosis: Testing of large breeding flocks with destruction of positive reactors continued. The disease was less in evidence because of the control programme and the decline in imports.

Other diseases: Diseases of less economic importance in 1961 are described in the report for the Veterinary Division.

FISHERIES

Principal Fishing areas

The principal fishing areas are the inland waterways, reservoirs, fish ponds and farms and sugar cane flood-fallow fields which supply fresh-water fish. The estuaries are the main sources of the supply of small fish caught by Chinese-seine. The inshore waters along the coast and around the islands of the estuaries are the principal source of pinseine fish, mainly mullets and snook. Offshore, in deep water, is the traditional snapper fishery which extends from off the coast of Cayenne to off the coast of British Guiana, in the 70 to 90 fathoms depth. This is operated by snapper vessels which bring their catch to Georgetown. Apart from this, there were four local trawlers and forty-eight American trawlers, which fish offshore for supplies of fish and shrimp. The American trawlers bring in mainly supplies of shrimp, most of which is graded, packed and frozen for export overseas. Fish caught by trawlers, principally local trawlers, has considerably augmented the local supply and has brought about a decline in the high prices which prevailed prior to their advent.

Output:

Statistics of landings are available only for the Georgetown and New Amsterdam areas and even these are incomplete. Nevertheless, since the sources of information do not vary from year to year, they may be used as reliable guides for assessing the trend of the industry.

Purchases by the Wholesale Fish Market were 671,852 lb. as compared with 550,309 lb. in 1960. Landings by trawlers on private docks rose from 1,114,000 lb. in 1960 to 1,158,987 lb. It is believed, however, that the increase has been understated.

4,300,000 lb. of shrimp were caught by trawlers as compared with 2,513,000 lb. in 1960. Exports were 4,170,200 lb. compared with 2,522,568 lb. The quantity of fish retailed in the Municipal markets was assessed at 3,848,160 lb.

Generally speaking, more fish at cheaper prices were available throughout the colony during the year. The average price for the major species caught by trawlers was 12 cents per lb.

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Aquarium Fish Trade:

The export trade in aquarium fish continued to flourish and exports were maintained at the level of the previous year.

Development of the Industry:

The shrimp industry continued to prosper, the number of trawlers catching shrimp for export increased from 34 to 48. A local firm established additional facilities for the docking of these vessels and for handling and packing their catches. The estimated capital value of assets devoted to shrimping is about $6 million; about 250 persons are employed.

Locally owned trawlers involved in fishing increased from two to four. The fishing flats are most productive and these trawlers are already catching more than the local market can consume.

In view of the improvment of fish supplies, much work was done to improve marketing facilities. The Fisheries Division helped to organise the construction and distribution of ice boxes. In addition, some 12 modern fish shops with cold storage facilities were opened in Georgetown, and the refrigeration plant at the Fish Market was improved. However, much more remains to be done if marketing is to keep pace with the growth of production.

The Fisheries Division refunded to fishermen $43,976 representing duty paid on imported goods used in the industry. Trials were made with a new polythene material for net making and were so successful that fishermen have begun using it in place of the customary material.

With a view to improving communications, radio telephones have been installed in the office of the Fisheries Division and in the Investigation vessel "Dainty" to keep in contact with vessels at sea.

The facilities at the Central fish wharf for docking, net drying and boat repair are proving inadequate, having regard to the growth of the industry.

SECTION 11

DEPARTMENT OF AGRICULTURE

Organisation

The Department of Agriculture is a Department of the Ministry of Natural Resources and is administered by the Director of Agriculture assisted by a Deputy Director and four Assistant Directors who are directly responsible for the four main functional sections of (1) Research, (2) Veterinary and Animal Husbandry, (3) Extension and Field Services and

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(4) Administration and Development.

The work of these sections and divisions of the Department is described in the ensuing pages of this report. A list of staff is given in the Appendix. Table IX sets out the Organisational Chart of the Department.

Close contact is maintained by the Department with Statutory Organisations concerned with Agriculture and Fisheries. The Director of Agriculture is Chairman of the Sugar Experiment Station (which is financed by the Sugar Producers' Association) and Chairman of the Sugar Industry Rehabilitation and Price Stabilisation Funds Committee. He is a Director of the Rice Development Company, a member of the Rice Marketing Board and of its Executive Committee, a member of the Council of the Rice Producers' Association, Chairman of the Fishery Advisory Committee and a member of the Industrial Committee of the Royal Agricultural and Commercial Society. A list of these and other committees is given in Section IV.

Funds voted to the Department by the Legislative Council were $2,138,152 for recurrent services and $1,346,276 for Development projects.

Staffing

(i) Professional

The shortage of experienced senior professional staff continued and at the time of writing there were the following vacancies:-

Recurrent

	Establishment	Vacancies
Chemists	3	3
Agricultural Economist	1	1
Soil Surveyor	1	1
Agricultural Officers (Research)	3	1
Curator, Botanic Gardens	1	1 *
Veterinary Officers	5	2
Agricultural Officer (Animal Husbandry)	1	1
Agricultural Officers (Extension)	12	6
Entomologist	1	-
Pathologist	1	-
Agricultural Engineer	1	-
Economic Botanist	1	-
Fishery Officers	2	1@
	33	17

* on pre-retirement leave

@ one on secondment to F.A.O.

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The shortage of experienced officers, would have appeared worse, had not some officers possessing the barest minimum professional qualification been promoted to higher posts. In addition, some Field Assistants who had been performing increased duties were promoted against vacancies for agricultural officers. While this policy, undoubtedly, has given financial reward to those who are helping to bear the strain of the day, it is only a palliative and could hardly help in achieving the high standards which should be the goal of a scientific department in this day and age.

Early in the new year, Government announced an increase in Civil Service salaries but with prospects of a reduction of existing "fringe benefits" such as leave. Simultaneously, there have also been higher rates of income tax. It is not known what long term effect this will have on recruitment but it is perhaps coincidental that resignations have increased.

The Overseas Aid Scheme, under which Officers recruited by the Government of the United Kingdom would receive certain additional emoluments to induce them to accept employment and remain in service overseas was announced. This might help to attract recruits from the United Kingdom to the local service.

(ii) Technical

The supply of junior technical staff was good. However, the lack of senior experienced supervisory staff to train young officers is a serious matter. The result is that many young men, without adequate supervision develop an indifferent and irresponsible attitude to their work and are not giving the service which is expected of them.

Training

The annual award of one scholarship to the Imperial College of Tropical Agriculture, now the Faculty of Agriculture of the University of the West Indies, continued. One student returned from McGill University, after having obtained his M.Sc., in Agriculture.

The number of students in training at Universities on Scholarship or financed by loans from Government was four (4). There is need for a considerable increase in the number of scholarships if the expanding requirements of the Department for professional staff are to be satisfied.

Fourteen students, on scholarship from Government were in training at the Eastern Caribbean Farm Institute. Seven returned after having completed their training and joined the Department as Field Assistants.

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ORGANISATIONAL CHART

DEPARTMENT OF AGRICULTURE - BRITISH GUIANA.

DIRECTOR

DEPUTY DIRECTOR

CLERICAL STAFF - Executive Officer
Accountant
Central Accounting Staff
District Accounting Staff

ASSISTANT DIRECTOR (Administration and Development)

ECONOMICS DIVISION
FISHERIES DIVISION
BOTANICAL GARDENS
METEOROLOGICAL SERVICES
DEVELOPMENT SCHEMES

ASSISTANT DIRECTOR (Extension)

DISTRICT STAFF AGRIC. EDUCATOR
AGRICULTURAL OFFICERS (11)
AGRICULTURAL ASSISTANTS (5)
FIELD ASSISTANTS (39)
(District Demonstration Stations & Nurseries)
FARM YOUTH TRAINING
INFORMATION DIVISION
LAND SETTLEMENT (Agricultural Services)

ASSISTANT DIRECTOR (Research)

A.O. (Perennial Crops)
A.O. (Annual Crops)
A.O. (Rice)
A.O. (Fibre & Pasture)
Plant Pathologist
Entomologist
Entomologist (Rice Storage Investigations)
Agricultural Chemists (3)
Soil Surveyors (2)
Soil Scientist (1)
Agronomists (Soil Surveys) (2)
CENTRAL AGRICULTURAL STATION ϕ

ASSISTANT DIRECTOR
(Veterinary & Animal Husbandry

Veterinary Officer (Research) (1)

Veterinary Officers (General) (4)

Livestock Officer

N.B.:- // There is an Administrative Committee comprising D.D. of A. Chairman, A.D.(V) & A.D.(R).

ϕ There are a central Research Committee with D. of A. as Chairman, A Rice Research Committee and a Consultative Committee for C.A.S.

Three officers undertook short training courses in special subjects in the U.S.A. under the auspices of the Agency of International Development.

Technical Assistance

(i) United Kingdom: The United Kingdom continued to provide financial support for a large number of technical projects. Funds from this source maintained the following schemes:-

Cacao Development: (D4457)	Research on the performance of cacao on the riverain and lateritic hill soils; the production of planting materials; the erection of fermenting and drying facilities.
St. Ignatius Livestock Station: (D4332)	Research on improving the cattle industry in the Rupununi savannahs; the provision of a Veterinary officer; introduction of improved breeds; range improvement and related studies.
Ebini Livestock Station: (R1133)	Research leading to the establishment of a cattle industry in the intermediate savannahs; nutrition studies; introduction of suitable breeds and improvement of native cattle;
Soil surveys:	Part contribution to United Nations Soil Surveys Project embracing preparation of a soils map of the country; detailed soil surveys of specific areas; field experiments by Agronomist to determine suitable crops and fertiliser requirements of new areas.
Staff Training: (D2900B)	Financing the training of eight students annually at the Eastern Caribbean Farm Institute.
Fisheries: (D2555A)	Establishment of a brackish water Fish Culture Station; trials with new gear; improvement of facilities, prototype fishing boat; research.
Central Agricultural Station: (D4247/R1152; D1931 & A)	Establishment of a Central Agricultural Station of 1,000 acres on the coast, including erection of a new laboratory.
Hosororo Experiment Station: (D2319 & A)	Expansion of Station in the North West District for investigations into problems of the area and into the introduction of new crops.

Contact was maintained with the Department of Technical Co-operation and notably with its Agricultural Adviser, Sir Geoffroy Nye, whose continued encouragement and assistance is gratefully acknowledged.

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The Tropical Products Institute continued to advise on a number of matters and finalised its investigations on the preparation of instant coffee from the local liberica variety. The Institute was visited by the Minister of Natural Resources, the Director of Agriculture and the Industrial Officer during their mission to London in November.

(ii) United States of America: The Agency for International Development (A.I.D.) formerly the International Co-operation Administration (I.C.A.) assigned the following technicians to the Department:-

Mr. J. Wheat	-	Horticultural Specialist.
Mr. R.B. Gregg	-	Rural Credit Specialist
Mr. A.C. Hale	-	Crop Specialist
Mr. C. Kauffman	-	Fisheries Specialist.

The following completed their assignments and left during the year:-

Mr. D.H. Lee	-	Marketing Specialist
Mr. D. Carter	-	Rural Youth Specialist.
Dr. Adams	-	Vocational Agriculture Specialist.
Mr. M.E. Knickerbocker	-	Livestock and Extension Specialist.

The work of these gentlemen, whose counterparts are local officers, is described in the divisional reports of the Department.

Training courses were arranged in the United States of America for members of the Staff in Extension and Horticulture. Scientific films, books and materials such as seed and other planting material were again supplied through the Agency.

Dr. Grant, citrus pathologist, was made available to carry out a survey of diseases of citrus in the country and to recommend a programme of research and of protection against the introduction of diseases. The young local specialist officers with whom Dr. Grant was associated have acknowledged the benefits which they derived from contact with him. It is hoped that this type of technical aid, whereby specialists of world renown are brought to the country even for a short period, would continue because not only are the relevant problems competently dealt with but local staff receive good training, at first hand, from the specialists.

(iii) United Nations: The Soil Survey Project, financed by the United Nations Special Fund, C.D. & W. and the local Government made good progress. Six (6) specialists, including the Project Manager were employed. Unfortunately, the original two local professional counterparts have both resigned and the

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project is being conducted entirely by the United Nations Staff directing inexperienced local junior personnel. However, there are two experienced local soil surveyors, who are performing quite creditably.

At the time of writing, some 500,000 acres had been surveyed in detail mainly on the old and new coastal plains.

The Minister for Natural Resources with the Director of Agriculture, as Adviser, attended the meeting of the Food and Agriculture Organisation of the United Nations held in Rome in October. British Guiana was accepted as an Associate Member.

A meeting on dairy problems in Latin America, organised at Sao Paulo, Brazil, by the Food and Agriculture Organisation, was also attended by the Director.

(iv) Regional: Close contact was maintained with the Caribbean Organisation. A livestock tour of Jamaica to which British Guiana sent four representatives, was organised by the Commission. A meeting of fisheries officers was also held.

With the collapse of the Federation of the West Indies, there was a decline in formal technical co-ordination. However, the usual direct contact was maintained with such organisations as the Imperial College of Tropical Agriculture, the Central Cane Breeding Station and with Departments of Agriculture.

General:

The Department of Agriculture has established its value to the country over the years of its existence. In view of contitutional changes, it is expected that the Department will become integrated with the Ministry of Natural Resources into a Ministry of Agriculture, Forestry and Lands. It is hoped that this development would not lead to the chaos and frustrations among technical staff which the process has brought about in some territories Much would depend on the Minister and his administrative staff ensuring that technical men continue to perform technical duties under technical direction without interference or direction from extraneous sources or from enthusiastic laymen. At the same time, technical men must show the initiative to produce results quickly and to work with dedication so as to justify their place in the scheme of things.

The Department has the confidence of the Government and of the people. A solid foundation has been laid but much remains to be accomplished. Given staff of the desired quantity and quality, and adequate funds for financing new projects, it is certain that agriculture would make more rapid strides than it has done in the past and hopes for the production of new crops, the settlement of the interior and the creation of new industries based on agriculture would be realised.

RESEARCH AND EXPERIMENTATION

Organisation of the Research Service.

The Research Division consists of the Assistant Director (Research) whose function is to co-ordinate the work of a team of specialist officers consisting of an Economic Botanist, two Entomologists, a Plant Pathologist, three Agricultural Chemists, two Soil Surveyors, three Agricultural Officers who deal with (a) Annual Crops (b) Perennial Crops and (c) Grassland and Fibre Crops. With the exception of the Chemistry Division, Specialist Officers of the various Divisions have temporary laboratories at the Central Agricultural Station where they are provided with quarters so as to be within easy access to their laboratories and field experiments. Funds have been provided for the new Agricultural Research Laboratory at the Central Agricultural Station and the erection of the building has just been completed.

In addition to the Central Agricultural Station, which serves as the main centre of research, there are four other Stations of the Department primarily engaged in research work on the crops of the areas in which they are located and, at the same time, the officers stationed carry out advisory work among the farmers. The Mon Repos Agricultural Station in the North West District deals with the main crops of the area such as citrus, cacao, coffee, maize and root crops generally and in addition with the fertility problems associated with the deep pegasse (peat) soils. The Ebini Livestock Station on the right bank of the Berbice River and about seventy miles inland is situated on an area of poor sandy soils representative of the district. This station is investigating the possibilities and economics of beef production under the conditions of low soil fertility and extremely poor natural pastures. The St. Ignatius Livestock Station in the interior Rupununi savannahs is also engaged with the problems of livestock production, animal health, pastures and breeding for the beef producers in the area. The Cacao Research Station at Atkinson on the right bank of the Demerara River and about 25 miles from Georgetown deals primarily with the introduction and trial of cacao clones in addition to plant propagation. Nurseries for citrus, including limes are established at the Station as well.

There is a Central Research Committee with the Director of Agriculture as Chairman, the Deputy, three Assistant Directors and the Sugar Agronomist as members. This Committee approves the general programme of Research to be pursued in the Department in relation to the policy of Government. In addition, there is the Rice Research Committee with the Assistant Director (Research) as Chairman, and other specialist officers as members.

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This Committee discusses the technical problems related to the rice industry and submits programmes of investigations to the Central Research Committee for approval. There is also the Sugar Research Committee consisting of the Director of Agriculture as Chairman and research officers of the Department and allied organisations review the progress on sugar research undertaken by Companies, the Sugar Producers' Association and Department of Agriculture. There is a Livestock Committee with the Director of Agriculture as Chairman and specialist officers of the Department, including Scientists of the International Co-operation Administration of the United States as members. This Committee studies and approves the programme of work relating to the Livestock Industry in the Country.

Other Research Organisations:

The Sugar Experiment Station which is maintained by the Sugar Producers' Association serves the sugar industry and is engaged primarily in varietal, fertilizer and cultivation investigations. Bookers Sugar Estates Ltd., maintained a well-equipped research laboratory and a team of technical staff, under a technical Director, to investigate, in greater detail the problems of sugar cane cultivation on their plantations. In addition, other plantations carry out limited research for their cultivation and processing of sugar and its by-products.

The British Guiana Rice Development Company Ltd. continued to test research results applicable to the mechanised cultivation of rice on its 3,000-acre farm. The Department of Agriculture has assumed responsibility for experimental work on 100 acres of land in this area.

Sugar Cane

The work described for this crop was done by the Sugar Industry, with the exception of resistance ratings for Leaf Scald disease which were carried out by the Plant Pathology Division of the Department of Agriculture.

Variety Testing (Sophia Experiment Station).

During the year, 14 experiments were planted and 80 harvested. Seven experiments due for reaping in the spring of 1962 were reaped in the Autumn of 1961.

Do 125/54 and D26/52, having shown their superiority over the other varieties under test, were distributed to Estates for testing on larger acreages. B41227 & B37161 maintain their position as the important commercial canes in the Colony.

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Demerara-Barbados Seedlings:

At the beginning of the year, shipments of "Fuzz" from Barbados continued and were sown at Sophia. Eventually 42,395 seedlings were planted out in the fields. These seedlings will be designated the DB60 series.

At the time of writing, 186 seedlings have been selected from DB59 Series and selection within the remaining seedlings will continue in 1962.

The first of the shipments of "Fuzz", which will eventually form the DB61 Series, have already been received and sown in boxes at Sophia.

Demerara Seedlings:

From crosses made at Sophia during late 1960, 19,780 seedlings were planted out in the fields and those selected will be designated the D60 series.

Selection within the D59 series will be made early in 1962. "Fuzz" has been collected from 104 crosses made at Sophia during the Autumn of 1961. 12 of these crosses were made using arrow preservative solution.

Barbados Cuttings:

Out of the B44 varieties of the B60 Series, 98 were selected during 1961 and this number will be further reduced during 1962 and those finally selected will be placed in sorting trials.

In October 1961, 335 varieties of the B61 series were received from Barbados and are growing well at Sophia

Testing of Varieties for resistance to Leaf Scald disease (X albilineans)

Tests done by the Plant Pathologist to determine the resistance of varieties to Leaf Scald Disease gave the following results:-

SEEDLING 1960

Resistance	Barbados	Dem/Barbados	Demerara
Very susceptible			
Susceptible	5717, 5748	255/55	8/52
Susceptible tolerant	5128,5718	125/52	248/55
Tolerant			
Resistant			

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Variety Tests (by Sugar Companies):

In addition to the above, the following foreign varieties were received through the B.W.I. Central Plant Quarantine Station and were under test on estates:-

Hawaiian	44-2608;	45-2860;	44-2364;	45-2708;	46-2404;
	47-1914;	47-4991;	48-4608;	49-5;	50-7209.
Mauritius:	M31/45;	M147/44			
Queensland:	Q.66;	Q67;	Q68;	Q70;	
Puerto Rico:	P.R980;	PR1013			
Brazil:	C.B. 40-69				
Cuba:	C.676-47;	C693-47;	C529-50;	C236-51;	

Other Research

The Technical Department of Agriculture of the major sugar company - the Booker Group - undertook research and investigations into a wide range of problems. It is possible only to give a very brief summary of this work.

(i) Cane Analysis

A major improvement of cane analytical equipment available to the laboratory was recorded by the use of a modified chaff cutter to cut cane into 1/16" slices. A sample of these slices can be blended directly in a Waring Industrial blendor leaving eventually clean fibre and diluted juice.

(ii) Cane ripening chemicals and desiccants:

The materials investigated included potassium phosphate sprays, molasses sprays, paraquat and Reglone. The results so far are inconclusive, in terms of economic use.

(iii) Determination of sucrose balance sheet:

Investigations were started to determine the most profitable periods for harvesting cane having regard to the build up of its sucrose content during the life of the plant.

(iv) Pests and Diseases:

Baiting trials against the field rat Holochilus continued. The use of anticoagulant coumarin type poisons such as warfarin was suspended as the rats appeared to have developed a resistance to them.

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Pelletised endrin bait 3/16" in diameter is in general use. There is a permanent rat control organisation on estates and since the campaign started, some 250 million pellets have been distributed.

Several investigations on insecticidal control of Castnia were carried out. Flooding continues to be the most economical method and flooding for 48 hours was introduced instead of the traditional flooding for 72 hours

(v) Weedicides:

A very wide range was tested. The chloromethyl ureas, the triazines and the experimental herbicide C.P.31675 gave significantly better herbicide control than a single application of 2,4-D amine at the standard dosage.

Dalapon proved the most effective grass herbicide for post emergent application but care has to be taken to prevent damage to the cane. Herbicidal oils and the new contact desiccant paraquat offer opportunites for use in the future.

(vi) Fertilisers:

There were no new developments. Sulphate of ammonia is the best nitrogen carrier, and triple superphosphate is as good as other forms of phosphate.

The discovery of deposits of shell on various estates proved economically valuable.

(vii) Irrigation experiments:

Many new techniques were tried. One of practical interest is the making of an irrigation ditch in the crown of the bed.

(viii) Improvement of Toxic Pegasse Soils:

A technique of inestimable value in the treatment of toxic pegasse soils in this country was evolved by the use of sea water to treat affected areas. Soil analyes before and after sea water flooding showed considerable reduction in aluminium and an increase in non toxic elements such as magnesium, sodium and calcium.

This method could open up for productive use almost 100,000 acres of pegasse lands which have been written off as worthless for agricultural purposes. The problem which remains to be solved is that of making the sea water available at an economic cost in the areas where it is needed.

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Rice

Introduction, Breeding and Genetics;

The breeding programme continued with observation of new introduced and local varieties, backcrossing and trials on the more promising new varieties.

In the observation plots, 195 imported varieties and 131 locally bred ones, a total of 326 varieties were compared for yield, disease resistance, maturation period and adaption to specific local conditions with No. 79 as standard. All the locally selected types were non-loding.

Of the locally selected varieties, about 20% exceeded the yield of No. 79, about 12% showed signs of resistance to blast at 5 - 6 weeks.

About 5% of the imported varieties exceeded the yield of No. 79, but they were either lodging or susceptible to Helminthosporium or Blast.

The Back-crossing programme aims at the production of a non-lodging type with other characteristics similar to the local standard types. There are now 365 1st backcross non-lodging selections in F5 which approach close to No. 79, and 58 second backcross hybrids in F, which are more closely similar to No. 79. There are also 75 1st backcross non-lodging selections of backcross parent D52-37 in which the grain is shorter than the parent. Selections from straight cross populations is also continuing, but to a smaller extent than from backcrossed populations.

Varietal testing in drill strips with systematic check plots of No. 79 as standard was done with 21 newly bred varieties which gave satisfactory yields in small plots maintained as varietal stock. Of these, 5 exceeded the yield of No. 79 at the Central Agricultural Station and 7 at the Mahaicony/Abary.

Thrity-one (31) new varieties have reached the level for replicated trials in different localities; at Mahaicony/Abary, on pegassy clay, ten of these out-yielded No. 79 by 20% or more, at the Central Agricultural Station, frontland clay, nine yielded 30% or more than No. 79, and at Land of Canaan of 20 varieties tested, all gave overwhelmingly higher yeilds than No. 79 due to the high susceptibility of the latter to blast (Piricularia oryzae)

The yield results of the Land of Canaan trials are shown below with a rating for blast resistance as follows:- 1 = highly resistant, 2 = slightly resistant, 3 = susceptible and 4 = highly susceptible.

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Results of an experiment with new Varieties at Land of Canaan

Variety	Yield in lbs. per acre	Yield Percent No. 79	Blast Score
B.G. 60145	5197	722	2
B.G. 6051R1	5025	698	2
B.G. 6040	4719	655	2
B.G. 6035	4665	648	1
B.G. 6078	4290	596	2
B.G. 6041	4187	582	2
B.G. 6034	3864	536	2
B.G. 60157	3843	533	2
B.G. 60216	3630	504	2
B.G. 60196	3539	492	2
B.G. 60200	3445	479	3
B.G. 6074R2	3377	469	2
B.G. 60106	3112	432	1
B.G. 60114	3258	453	1
B.G. 6064	3110	431	1
B.G. 6052	3071	426	1
B.G. 6074R1	2965	412	2
B.G. 6065	2902	389	1
B.G. 6084	2087	290	4
B.G. 6056	1982	275	4
No. 79	720	100	4

There was found to be a fair relationship between symptoms at 5 weeks and yield but some varieties recovered later on. No variety imported as being blast resistant maintained this characteristic.

Farmers trials of new varieties.

Four of the most promising new varieties 6044, 6047, 6036 and 60260 were tested in commercial planting on the lands of farmers on a reasonably wide scale from Better Success in Essequibo to No. 72 village in the Corentyne. These trials demonstrated to farmers that an erect type was needed for mechanical harvesting. Other observations indicate that 60260 is well adapted to soils of low fertility; 6036, 6044 and 6047 can grow in highly organic soils without lodging; 6044 and 6047 appear under normal cultivation conditions to be resistant to blast. Given conditions of

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suitable husbandry, the four varieties outyield No. 79, and 6044 and 6047 show a very high milling quality and produce grain of a high quality, suitable for export. These latter two varieties appear suited for areas that are newly cleared where the soils would be highly organic, blast infestation high and harvesting done mechanically. Seed is being multiplied for distribution to such localities.

Control of "Drop-Seed" and weeds.

An experiment with Eptan (Ethyl N, N, di-n-propyl thio carbamate) applied as a pre-emergence treatment to the soil, and Paraquat di(methyl sulphate)1:1 dimethyl-4-4,4 bipyridylium do (methyl sulphate), applied by spraying in 10 gallons of water per acre to 3 week plants of "drop-seeds" gave the results in the table shown below:-

Chemical	Rate	% mortality of drop-seed
	lbs/ac.	
Paraquat (di methyl sulphate)	0	0
	1	63
	3	72
	6	66
	lbs/ac.	
Eptam	0	0
	1	0
	3	0
	6	0

Paraquat (di methyl sulphate) has proved to be promising and it is now proposed to try it on a larger scale at different stages of growth with wetters.

Control of weeds in rice:

Reglone (1:-ethylene-2:2-dipryridylium dibromide) applied to dense stand of busy-busy, (Cyperus articulatus), at 1½ pints/ac. enabled a more complete burn prior to ploughing than Dalpon or 2, 4-D at the same rate.

It has been demonstrated that drainage for one week from the time of application of Fernimine has a distinct advantage, resulting in a complete kill of nearly all non-graminaceous weeds of rice-fields.

Fertilisation of Rice lands.

Two groups of trials were conducted - one by the Economic Botanist and the other by the Agricultural Chemist. The trials conducted by the former were sited at the Central Agricultural Station and at the Mahaicony/Abary on Pegassy clays; those of the latter in addition included a number of trials on the lands of rice farmers in each of the three counties. None of these trials gave results of any significance or added new knowledge to what is already known about the subject.

Other husbandry factors:

A number of other factors affecting yield was investigated. These were frequency of irrigation and method of seeding and seed-treatment. On the irrigation trial four varieties were compared with No. 79 as control, the treatments being, flooded continuously, irrigation twice weekly, once weekly, once fortnightly and once every three weeks. Observations were made on yield, days to flower and length of ear and are as under:-

Results of trial on severity of drought on frontland clay.

	Flood Continuously	Twice Weekly	Once Weekly	Irrigate once Fortnightly	Once every three weeks
Mean yields in lbs/ac.	2280	2388	2104	2528	2152
Mean No. of days to flower	84	84	88	96	102
Mean length of ear (in each)	25.95	24.92	23.3	22.1	20.0

A similar trial at Mahaicony/Abary was affected by rains which flooded the experiment for about ten days. The seedling trial compared different rates of treating seed with Agrosan and methods of sowing viz. germinated seed, dry seed and seed and seed soaked for 36 hours. Results indicate that treatment with 1% Agrosan is an adequate rate and that soaked seeds gave a significantly higher yield than dry seed which was in turn significantly better than germinated seed.

Pests and Disease of Rice:

Control of rice water weevil (Lissorhoptrus sp.) by seed treatment.

Experiments were carried out in the laboratory and in the fields to test (1) the effectiveness of different seed treatment for controlling rice water weevil and their effects on yields and (11) the effects of the various seed treatments on the germination of the seeds when treated and kept in storage. In the experiments carried out so far, none of the treatments gave any significant increase in yield but Aldrin at 2 ozs of active material and Dieldrin at 2 ozs. of active material in combination with Agrosan GN at 5 ozs. per 100 lbs. of seeds gave consistently higher yields than the control. The increase ranging from 2.3 bags to 4.7 bags per acre. In one experiment in which the incidence of water weevil was hi[illegible]drin and Dieldrin at 2 ozs. of active material per 100 lbs. of seed gave significant reductions in incidence of the larvae of rice water weevil. None of the treatments, Aldrin, Dieldrin and Lindane at 2 and 4 ozs. of active material per 100 lbs. of seeds, when used alone or in combination with Agrosan GN at 5 ozs per 100 lbs. of

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seeds had any adverse effects on the germination of the seeds of two commercial varieties, No. 79 and D110, when the seeds were treated and kept in storage for a period up to 6 months.

Effects of seed treatment on the yield and incidence of blast (Piricularia oryzae) on the varieties No. 79, 44-60 and 47-60.

In one experiment carried out in the field at Mara, seed-treatment with Agrosan GN at 5 ozs. per 100 lbs. of seeds when used alone or in combination with Dieldrin at 2 ozs. of active material per 100 lbs. had no effect on the yields of the varieties No. 79, 44-60 or 47-60, nor did the treatments have any effect on the incidence of rotten necks. However, the variety 44-60 gave a highly significant increase of 11.6 bags over the variety No. 79, and an increase of 6.1 bags over the variety 47-60 which was significant at the 5% level. The difference in "rotten-neck" counts between 44-60 and 47-60 were not significant but the difference between these two varieties and No. 79 was significant at the 1% level. The percent of "rotton neck" in 44-60 and 47-60 was 0.85 and 2.53 percent respectively and No. 79, 16.6 percent.

Trials on resistance to blast (Piricularia oryzae) conducted by the Plant Pathology division compared No 79 as standard with four new varieties 6044, 6047, 60260 and 6036. The varietal trials conducted by the Economic Botanist in the blast infected areas indicated a greater measure of resistance to blast in the newer varieties than in No. 79. The more rigid technique of predisposing the plants to blast together with positive inoculation resulted in a rather different rating.

Briefly the method consists of pre-disposing the plant to the disease by growing them in specially prepared beds, using sufficiently close spacing to increase humidity in the immediate vicinity of the plants in order to favour the development of the fungus; at the same time use was made of liberal amounts of nitrogen to obtain vigourously growing plants, under these conditions the physiological status of the plant is rendered more favourable for infection. This work showed that varieties 6044 and 6047 are moderately resistant and No 79. moderately susceptible 6036 was very susceptible.

Other Mycological investigations

Other mycological work on rice investigated the question of seed transmission of blast and grain discolouration. The further trials on blast established that Piricularia oryzae is carried on the seed in sufficiently high concentration to retard germination and produce grain discolouration. Investigation into the other agents responsible for grain discolouration

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confirmed that the condition is aggravated by excess moisture. The following is a list of fungi isolated:-

Aspergillus oryzae (fermenting organisms)
Aspergillus sp.
Penicillium glaucum
Monascus purpureus
Rhizopus
Alternaria sp. (brown spots or totally brown glumes)
Curvularia lunata
Pythium sp.
Helminthosporium oryzae (partially black grains)
Fusarium sp. (red grains)
Phoma sp.
Cladosporium
Nigrospora oryzae
Diplodia Oryzae
Verticilium
Rhizoctonia sp.
Piricularia oryzae

It is clear from the list, that the majority of fungi isolated from discoloured grains are already well known to be associated with distinct diseases of the foliage or inflorescences in the field. The others are, damping-off organisms responsible for early death of the seedlings.

Control:

Prevention of infection of the grains at harvest time should be based on avoiding those conditions which favour it, namely cutting while unripe, careless stocking, and allowing the grain to remain damp. Avoidance of sowing at a season when the seeds will not germinate readily, or seedlings develop rapidly.

Seed treatment with chemical dressings, Agrosan GN gives good control for the fungi carried on seed and protects the seed for possible attack by damping-off, pre, and post-emergent organisms of the seedlings.

Rice Storage Investigations

Experimental storage silos and driers suitable for the local farmer were built and tested. It is doubtful whether any of these would be adopted by the farmer.

Grasses

Introduction Programme

By the end of the year a total of 93 grasses and 46 legumes (including strains of the same species) had been tested on frontland clay soil. The more promising species were extended to preliminary grazing

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trials. Listed below are species which appear adapted to and to be productive under local conditions.

Grasses; grazing prostrate:

Digitaria decumbens (virus susceptible)
D. Pentzil (" ")
Cynodon dactylon Giant, Coastal
Ischaemum timorense (limited to some localities)
Brachiaria decumbens
B. brizantha
non-prostrate
Panicum maximum (selected strains)
Setaria sphacelata
Hyparrhenia rufa

" Fodder: annual:

Zea mays
Sorghum vulgare

" " perennial

Brachiaria mutica
Pennisetum purpureum
Panicum maximum (selected strains)
Trichascum laxum

Legumes: grazing: annual:

Vigna sinensis

" grazing perennial

Centrosema pubescens

" fodder: annual:

Vigna sinensis
Stizolobium aterrimum

" fodder perennial:

Centrosema pubescens
Pueraria phaseoloides

The only perennial legume which combined well with grasses under both cutting and grazing conditions was C. pubescens. For a short term fodder crop, the maize/cow pea mixture was highly productive.

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Fertilization:

Pangola and Coastal Bermuda grasses showed significant responses to Sulphate of Ammonia up to 800 lb. per acre but returns appeared to be diminishing above 600 lb. Routine application continued at 600 lb/acre per annum. Responses to Phosphate, potash and lime were variable and in most trials non-significant. Paragrass was less reponsive to fertilisers, but applications of organic manure gave very good results and contributed to weed control and improved dry season yeilds.

There was no significant difference between Nitrogen applied as Sulphate of Ammonia, calcium nitrate or urea on paragrass, coastal Bermuda and Pangola at equivalent rates of N.

Annual production was in the region of 12,000 lb. dry matter per acre at 6-7% protein. This was based on an average cutting or grazing interval of 60 days and a fertiliser application of 6 cwt. Sulphate of Ammonia, 1 cwt. triple Superphosphate and ½ cwt. Muriate of Potash per acre per annum.

The stocking rate on improved pastures at the Central Agricultural Station continued at one animal (cattle) per acre.

Conservation:

Trials were carried out with both hay and silage to conserve surplus wet season production. Silage production appeared well suited to local conditions and requirements, but the present land lay-out hinders the effective use of machinery. Silos of the walled clamp type were used. The results indicated that the additional cost of permanent structures over earth wall types was justified as excessive spoilage losses were reduced. Crops ensiled included Maize, Cowpeas, Pangola, Guinea and Elephant grass.

Hay of a satisfactory quality was also produced. It should however be recorded that weather conditions were favourable for hay-making and ensiling.

Pests and Diseases:

The presence of Pangola stunt virus in British Guiana was confirmed. Its presence in Surinam had been noted, and towards the end of 1961, it appeared to have spread in British Guiana to all areas where pangola had been introduced - the Coastal areas as well as the North West District and Ebini. The Delphacid vector Sogata fucifera was collected both at the Central Agricultural Station and the Ebini Livestock Station. The infected area total approximately 1500 acres showing varying degrees of severity which appeared to be in direct proportion to the age of the cultivation. Research work aimed at finding resistant strains of the Digitaria sp was started.

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THE JENMAN HERBARIUM

Work in the Jenman Herbarium during the year may be summarised as follows:-

Operations	Number of Units
Indentification of specimens	399 specimens
Mounting " "	680 sheets
Exporting	41 Specimens
Labelling " "	700 sheets
Poisoning	1,850 sheets
Fumigation	22 cabinets

Several field expeditions were undertaken along the coastlands, in forests along the river banks and to the intermediate savannahs to collect specimens.

Annual Crops:

Field layout for rice land for rotation with annual crops. Further experiments on this aspect of husbandry indicate that 72' is the optimum bed width for both frontland clays and pegassy clay. By suitable ploughing the beds are slightly cambered for dry culture and flattened for rice cultivation. This layout permits greater convenience of operations, more uniformity of crop growth and economy in drains.

Progress with other annual crops was as follows:

With sesame (Sesamum orientele), improvements in technology were the successful expression of oil on a commercial scale using machinery now in the country and making it possible for farmers to sell their grain at a price of 10 cents per lb., and an increased yield by the application of basic slag which proved better than either superphosphate or ground limestone on frontland clay.

The arhar dhall (Cajanus cajan) was successfully harvested by rice "combines" after defoliation with "Reglone" (1:;-ethylene-2:2 - Dipyridylium dibromide) at 1½ pints per acre. Fertilising with basic slay, superphosphate or ground limestone resulted in growth which slowed down small combines, but should not affect larger Massey - Ferguson combines which are now being imported to harvest lodged padi. Two new varieties have been produced by hybridisation and selection and they split into a better final product than the present types. The black eye pea (Vigna sinenis) and mung (Phaseolus radiatus) responded well to applications of limestone and basic slag giving increases of the order of 60% over the control. Another strain of Black-eye peas has been selected for large seeds, earliness and uniformity of maturation.

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Selections of Castor (Ricinis communis) are continuing and 23 new varieties imported from Brazil through the I.C.A. Mission of the U.S.A. (now A.I.D.) with a view to selecting one for harvesting by combine are now in replicated tests. Two Indian varieties TMV 2 and Mc 6 were being distributed to encourage farmers to expand the production of this crop. Fertiliser trials during this year indicated that yields may be doubled by the application of basic slay at 1½ cwt. per acre.

Mass selections of local populations of corn (Zea mays) are continuing. The best type now available North West District selection No. 6009 was used in a fertiliser trial using 1½ cwt. sulphate of ammonia per acre applied at different times and gave the following results:-

Treatment	Yield effects
1 dose at 6 weeks of age 2 doses at 6 & 8 weeks of age 3 doses at 6,8, & 10 weeks of age.	1 dose gave 10% more than 2 doses and 25% more than three doses therefore 1 dose is apparently most economical.

Nine types obtained through the I.C.A. Mission of the U.S.A. did not prove promising.

The factors limiting the production of tomato (Lycopersicum esculentum) are the tomato mosaic virus, bacterial wilt (Pseudomonas solanacearum) and Blossom-end-rot. Four varieties were screened for resistance to mosaic, the plants being inoculated by sprinkling finely chopped diseased material on the plants two weeks after transplanting. The symptoms observed were:-

(i) Leaves mottled with light, dark green areas
(ii) Young leaves fine, elongated and almost fern-like in appearance.
(iii) Stunted growth
(iv) Fruits mottled with light coloured circular areas.

The results are shown in the table below:

TABLE X

TABLE SHOWING RESULTS OF TRIAL ON RESISTANCE OF 4 VARIETIES (25 plants each) to the 'TOMATO MOSAIC VIRUS'.

Disease Ratings are as follows:- Each Var. 25 plants

Variety	No. of Plants affected prior to flowering	No. of Plants affected after flowering	Total No. of plants affected	Fruits affected	Diseased free Plants
Pink Shipper	11	9	20	3%	5
Bounty	8	7	13	5%	12
Cgier	4	6	10	2%	15
Step 33A	1	3	4	-	21

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These results indicate that Pink Shipper is susceptible and that step 33A show considerable tolerance.

A trial of five varieties for resistance to bacterial wilt, Pseudomonas solanacearum gave the following results which indicate that variety 1960 step 3A is very resistant to bacterial wilt.

The following are the ratings in percent

Varieties	Wilting prior to application	Wilt after application	Total plants Wilted	Diseased free plants
Pink Shipper	66	20	86	20
Bounty	48	07	55	45
Ogier	23	03	27	73
Step 33A	18	10	28	72
Step 3A	none	none	none	all

Coconuts:

Emphasis is being placed on expansion for which seedlings are produced at various nurseries in the Colony. Selected nuts were collected from selected blocks situated at Chapman's Grove, Spring Hall and Cane Grove Estates on the East Coast Demerara. A suitable estate could not be found on the Essequibo district from which good quality seed nuts could be obtained. In Berbice only a small amount of good quality nuts could be obtained. Selected seed nuts had therefore to be shipped to these areas for planting in the district nurseries. During the year, 17,500 selected seed coconuts were sent to Essequibo and 27,000 to Berbice.

A total of 235,269 seed nuts were sown during the year, of which 190,669 were sown at the nurseries at the Central Agricultural Station. Rats destroyed a considerable number of seedlings both in Essequibo and at the Central Agricultural Station. At the latter site alone, 40,000 seedlings were so damaged as to render them unsuitable for distribution. In an effort to minimise damage, the nursery fields at C.A.S. were treated with Endrin pellets and the borders baited with Endrin Stock Feed. The distribution of seedlings from the nurseries to the various districts is shown in Table XL. Of the total of 116,261 seedlings distributed throughout the Colony, 72,303 were from the C.A.S. nursery. Transportation still is a problem due to the limited departmental transportation facilities, the long segments of bad roads on which the trucks have to travel. Frequently fair portions of shipments of seedling after the long journey on bad roads reach their destination in an impaired condition.

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TABLE XI

Distribution of Coconut Seedlings

QUARTERS	DISTRICTS					TOTAL
	Esseq.	W. Dem.	E. Dem.	Berbice	Misc.	
First	4,696	1,053	3,142	9,100	150	18,141
Second	11,758	1,300	17,250	23,801	328	54,437
Third	7,651	1,500	10,680	10,105	40	29,976
Fourth	950	240	500	12,000	17	13,707
	25,055	4,093	31,572	55,006	535	116,261

The important pests continue to be the caterpillar (Brassolis sophorae) and the moth borer (Castnia daedalus). The Brassolis is controlled by removal of affected leaves and distribution of pupae and caterpillar. Some of the larger estates have controlled castnia by periodic spraying with 1% Dieldrin spay. The coconut cockle (Strategus aloeus) caused some severe damage to young seedlings in Demerara and Essequibo, the damage in some estates being as high as 50% of the new planting. One control recommended was - destruction of old coconut trunks, and collecting of adult insects and treating around the young plants with a 5% aldrin dust.

Other important diseases continue to be Bronze Leaf Wilt, Unknown disease, and Bud-rot, and during the year the suspected presence of Red Ring was confirmed for two widely separated areas in the colony - Moruca in the North West District and Ankchaber in Berbice. Dr. F.W. Fenwick from the Trinidad Coconut Research visited the Colony late in the year and his report would form the basis for future work on this problem.

Citrus:

Like coconuts there are some established orchards of citrus in the Colony. Work on this crop, however, continues to be that of expansion by the production of budded citrus plants. Two nurseries are under the direct supervision of specialist staff, the one at Atkinson Field and started during this year one at the Central Agricultural Station. In addition, small district nurseries in Essequibo and Berbice produce budded plants for distribution to farmers.

At Atkinson Field, scab (Elsinoe Fawcetti) was brought under satisfactory control by the regular application of a 2% solution of Perenox once per week. On the nursery started at the Central Agricultural Station, 40,000 seedlings were transplanted to the field in July and by year end budding had commenced.

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Budded citrus plants were distributed to the various districts from the Central Horticultural Station at Atkinson Field as indicated in the table below.

TABLE XII

Distribution of Budded Citrus Plants

QUARTERS	DISTRICTS					TOTAL
	Berbice	E. Dem	W. Dem.	Esseq.	Misc.	
First	-	130	200	-	-	330
Second	-	10,783	750	-	123	11,656
Third	634	1,090	1,426	259	100	3,509
Fourth	-	4,042	1,920	200	600	6,762
Totals	634	16,045	4,296	459	823	22,257

Pests and Diseases:

Heavy infestations of the citrus aphid, Toxoptera citricidus, were observed in citrus orchards on the East Bank of Demerara, Berbice and the North West Districts. Regular spraying with Malathion at the rate of 1 fl. oz. of 57% E.C. per gallon of water was recommended as control measure. The scales (Lepidosaphes beckii, Aonidiella aurantii, and Chionaspis citri) were prevalent in citrus orchards throughout the country and resulted in unhealthy growth and poor quality of fruits. However, very little attempt is being made to control the insects. The black bee (Melipona guianae) caused some damage to young flushes and to the maturing fruit but was controlled by spraying with a bait spray of malathion and sugar.

The presence of Psorosis and/or Tristeza was suspected in some orchards, particularly on the East Bank Demerara. Through the auspices of the Agency for International Development, Dr. T.J. Grant visited and with the Agricultural Officer (Perennial Crops) and his A.I.D. counterpart Mr. J. Wheat, the Entomologist and the Plant Pathologist assessed the Citrus disease problems of the country. It did not appear that either of these virus diseases was present, but a programme has been set up to screen and test planting material.

Cacao:

Rooted clonal cuttings and open pollinated SCA hybrid seedlings imported from Trinidad were produced for distribution. A total of 57,660 plants were propagated for the year. Due to the problem of arranging prior payment for hybrid seeds, these were not obtainable towards year end.

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The distribution of cacao plants during the year is shown in the table below:-

TABLE XIII

Distribution of Cacao Plants

QUARTERS	DISTRICTS					TOTAL
	Berbice	E. Dem.	W. Dem.	Esseq.	Misc.	
First	-	350	400	-	-	750
Second	-	12,425	3,700	600	-	16,725
Third	2,900	5,963	13,587	-	2,008	24,458
Fourth	-	7,325	12,500	-	2,000	21,825
Totals	2,900	26,063	30,187	600	4,008	63,758

It will be observed that the bulk of the distribution was affected in the County of Demerara.

Efficient processing of beans is an important need, and the erection of a Samoan type Hot Air Cacao Drier early in the year contributed to a marked improvement in the quality of the beans. Towards year end farmers were granted permission to use the drier.

Other building operations at the Central Horticultural Station that should be recorded include - the erection of a small fermenting house, a general store-room, a fuel store-room, a hardening floor and a new soil shed as well as renovations to the office building and general repairs to the cacao hardening floors.

The establishment of a hybrid seed garden was commenced during this year for the production of SCA x ICS Hybrid seeds. Two acres in a 75 acre block of secondary forest was cleared and drained. This area is situated about ¼ mile south of the Station's buildings. The ICS clones and some of the SCA clones were planted.

EXPERIMENTAL WORK ON PERENNIAL CROPS:

Coconuts:

Experiment P5/60 - A coconut transplanting trial.

This experiment was designed to compare the growth and yield of coconut seedlings that were transplanted to the field at three different ages viz. when the seedlings were 6 ins. high, 12 ins. high and 24 ins. high.

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Experiment P2/61 - Factorial Fertiliser Experiment with Coconuts

This experiment was designed to compare the effect of various fertiliser combinations on the yield of commercial coconuts growing on the three soil types at C.A.S. The design of the trial is a $2^2.3.4$ factorial of three replicates using ground limestone, sulphate of ammonia, super phosphate and muriate of potash as the fertilisers.

The plants were planted out during 1960 and the fertiliser applications commenced in June this year.

During the third quarter of this year five seedlings were destroyed by Cockles (Strategus aloeus) in Field 27.

Also 14 plants in Field 61 were lost due to Bud Rot (Phytophtora palmiera).

Cacao:

Experiment P2/60 - Cacao Varietal Trial

A varietal trial to compare the yield of eight ICS clones commenced in April 1960 at the Central Horticulture Station at Atkinson Field. The trees were planted in 1954 and now receive a 1:2:2 NPK fertiliser mixture at the rate of 5 lbs. per tree per annum.

The results to date show that ICS clones 1, 40, 46, 48 and 95 gave significantly better yields than ICS 8 at the 1% level. There was no significant difference between the yields of the other clones.

The average yields ranged from 298 lbs. dry beans per acre from clone ICS 8 to 991 lbs. dry beans per acre from clone ICS 46.

Experiment P7/60 - Cacao Fertiliser Trial:

An experiment to determine the yield of some ICS 95 clonal cacao plants when fertilised with various rates of a 1:2:2 NPK fertiliser mixture, commenced in 1960 at the Central Horticultural Station.

The results to date show that there is no significant increase in yield due to the application of the fertiliser mixture, although an increase of 300 lbs. dry beans per acre per annum was obtained over the control, by the application of 2 lbs. of the mixture per tree per annum.

Experiment P8/60 - Cacao Varietal Fertiliser Trial

This experiment was designed to compare the effect of the application of fertiliser on the yield of three distinct cacao cultivars viz. ICS 95 clones, IMC 67 clones and SCA open pollinated hybrid seedlings. It was also replicated in three soil types.

The establishement of the cultivars were completed during 1960

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at C.H.S. and consequently no yield records are as yet available. During 1961 the temporary shade trees of bananas were removed.

Experiment P9/60 - Cocoa Varietal Shade:

This experiment was designed to determine the effect of three different permanent shade trees on the yield of six cacao cultivars.

This experiment is being conducted in conjunction with the A.O. (N.W.D.) and its establishment continued during this year.

Experiment P5/61 - Temporary shade trial of Cocoa.

This experiment was designed to compare the rate of growth and subsequent yield of two types of cacao grown under four types of temporary shade plants.

The establishment of this trial commenced at C.H.S., Atkinson Field in December of this year.

Citrus:

Experiment P10/60 - Sour Orange seedling trial

A preliminary experiment, aimed at improving the rate of growth of Sour Orange seedlings for budding stock under Atkinson Field conditions, indicate that a 1% solution of Puramex applied twice per week increased the rate of growth of the seedlings by suppressing the incidence of Citrus Scab (Elisone F wcetti).

Experiment P3/61 - Citrus Varietal Fertiliser Experiment.

This experiment was designed to compare the effect of certain fertiliser mixtures on the yield of some varieties of citrus growing on the three soil types at C.A.S.

The plants were planted out during 1960 and a certain amount of the plants had to be supplied during this year. The fertiliser applications also commenced in June this year.

A certain amount of plants of various varieties are still however to be supplied.

Papaws

Experiment P4/61 - A preliminary factorial fertiliser experiment with Papaws.

This experiment was designed to compare the effect of certain fertiliser combinations on the yield of pawpaw and papaws from two varieties of papaws.

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This experiment was planted out at C.A.S. in December 1960, but was discontinued in 1961 as a statistical trial due to (a) a continuous die back of the plants resulting from drought conditions at the beginning of the year and (b) the high incidence of Anthracnose of the fruits.

Soil Surveys:

The Soil Survey of British Guiana financed by the United Nations Speical Fund, United Kingdom and the local Government made good progress. The Soil Survey Advisory Board, under the Chairmanship of the Minister of Natural Resources with heads of interested Government Departments and a representative of the Soil Division of the Imperial College of Tropical Agriculture, as members, held two meetings.

Detailed surveys of Crabwood Creek/Moleson Creek, Port Mourant backlands, Mara backlands, Tapacuma/and Wauna/Yarakita, involving an acreage of some 50,000 acres were completed. Work was in progress, at year end, on the area to be commanded by the proposed Mahaica/Mahaicony/Abary and the Greater Canje projects, and adjacent areas. At the time of writing some 600,000 acres have been completed. The rapid progress of the survey was achieved principally by the use of an amphibious vehicle - the Swamp Fox - which ensures a rate of survey at least ten times as fast as the pedestrian method. Weather conditions were also favourable. Credit is due also to the efficiency of organisation and to the competence shown by the U.N. Team.

The Chemist of the U.N. Team collaborated with the Director of Agriculture, Research, of Bookers Sugar Estates in investigations into the aluminium toxicity problems of pegasse soils. The use of sea water to improve these soils was one of their findings and the method holds promise of becoming of major importance to the future of local agriculture.

The Chemists of the Department continued to work on the fertiliser problems of local soils, to examine soil samples sent by district agricultural field officers, and to make analyses of sugar cane juice as a basis for determining the price to be paid for farmers' cane.

EXTENSION SERVICE

Organisation

The organisation of the Extension Division, viz, Administration by an Assistant Director, an Agricultural Officer in each of the major agricultural Districts and two Agricultural Officers at Head Office - one responsible for agricultural work on land settlements and the other for Education and related matters - remained unchanged. The Agricultural

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Officer, Upper Mazaruni and Kamarang left on vacation leave and extension work in that district was temporarily suspended. An Agricultural Officer was assigned for the greater part of the year to the Berbice and Mazaruni-Potaro district. The Agronomist in the Rupununi was relieved of his extension duties, and an Agricultural Assistant was stationed at Lethem to take charge of extension work in the area.

One Agricultural Officer and two Agricultural Assistants were appointed. Seven cadets returned from the Eastern Caribbean Farm Institute, and were appointed as Field Assistants. Four Field Assistants resumed duty after undergoing a two years' course of training at the University of Puerto Rico. While the supply of junior officers was good, the lack of an adequate number of senior supervisors reduced the efficiency of the Extension service. In addition the staff were burdened by extraneous duties such as administering the duty free petrol scheme, serving on selection committees for land settlements, work for rice assessment courts and so forth.

Eight cadets were selected for the 1961 - 63 Class at the Eastern Caribbean Farm Institute. The seven (7) cadets of the 1960 - 62 Class proceeded to the second year. In additiona there were at the Institute for the 1961 - 63 Course one (1) student nominated by the British Guiana Rice Marketing Board, and another by Messrs. Booker Bros., so that at year end the number of British Guianese students at the Institute was seventeen (17).

Programme of Work

The work planned for agricultural improvement and development was concentrated mainly as follows:-

(a) Rice - Efforts were directed along the same lines as last year viz. early planting, the use of pure line seed paddy and better agronomic techniques to improve the quality of paddy, the control of paddy bug etc..

(b) Sugar Cane - The same programme was followed as last year. With respect to the increased acreage granted to peasant farmers, only 108 new acres were planted, and these were in the East Demerara district.

(c) Coconuts - The incentive bonus payment of $20.00 per acre was continued, and efforts were maintained in the drive to increase the acreage under this crop: and to re-habilitate existing poor orchards. Encouragement to interplant with Indian and catch crops e.g. dhall, plantains etc. was continued.

(d) Cacao - The incentive bonus payment of $30.00 per acre for the satisfactory establishment of this crop was continued, but

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was varied to allow for the free distribution of plants (300 per acre) in lieu of cash. Maintenance of established cultivations and increased acreage on riverain lands were given prominence. The movement for co-operative fermentaries was continued, but without success. It is expected that with an increase in the area in production, farmers will be forced to take action as recommended.

(e) Coffee - The low price prevailing throughout the year resulted in little or no action as regards improvement in quality, control of disease and pruning. Co-operative processing and marketing however continued to receive attention

(f) Citrus - The same programme as last year but greater attention on co-operative marketing and grading.

(g) Vegetables - The incentive bonus payment of $20.00 per acre for the cultivation of cabbage and onion was continued. Attention continued to be directed to the use of organic manure, artificial fertilisers and the control of insect pests and diseases.

(h) New Crops - The incentive bonus payment of $15.00 per acre and the guaranteed price were continued for dhall, black eye peas, pea-nuts, sesame, castor-oil and urid. The cultivation of black-eye peas as a rotation crop with rice, wherever possible, was given special consideration.

(i) Dairy Production - The drive to improve the hygienic quality of milk continued despite the poor response. The incentive bonus for the cultivation of fodder and pasture was continued as well as the accent on improved husbandry techniques.

(j) Pigs - Approved breeders were encouraged to produce breeding stock for distribution. Improved management and feeding were also stressed.

(k) Poultry - Farmers were encouraged to increase egg production, together with grading and co-operative marketing of eggs. The emphasis on sanitation and proper feeding was continued.

(l) Rural Youth - The same programme as last year with even greater accent on Agriculture in project work.

(m) School Gardens - Interest in the new and bonus crops was encouraged wherever possible. Lectures were given by Field Officers to school garden students to stimulate interest in Agriculture.

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Extension Methods

Field Officers carried on with the conventional extension techniques of meetings, personal contacts, discussions, visual aids etc. to teach farmers and to stimulate interest in the adoption of new techniques.

Individual Methods:

Personal contacts on the farms, in the home, demonstration station, or the office continued to be the main source of teaching and advising farmers.

The Progressive Farmers' Scheme was continued, but the method of selection was modified in light of the experience gained during the past two (2) years. This scheme serves the purpose of method and result demonstrations on a farm selected by farmers in consultation with the Field Officer. It is partly subsidised. In addition to the Projects brought forward from 1960, thirteen (13) new projects were started in 1961. These new projects included pig and poultry rearing, cabbage and vegetable production and the establishment of citrus. These projects were also utilised for demonstrations, field days and visits by neighbouring farmers.

In addition, demonstrations on improved agronomic techniques, the control of pests and diseases, and the cultivation of the incentive bonus crops were carried out on several farms.

Farm visits and interviews recorded by the Field Staff for 1961 were 26,745 and 28,712 respectively.

Group Methods

Meetings, Field Days, demonstrations, film shows and group discussions were arranged from time to time in all the districts. These were mainly in connection with the cultivation of the incentive bonus crops, the use of fertilisers, the control of insect pests and diseases, improving the quality of padi care and management of citrus and coconuts, improving the quality of market pigs, pasture and fodder cultivation and improving the hygienic quality of milk.

Mass Methods:

The Department discontinued its participation in the programme "Rural Note-book" on the air, but nevertheless continued to broadcast information of agricultural interest from time to time. In addition information of topical interest to farmers were also featured in the Daily Papers and Government Bulletin. Mimeographs, leaflets and bulletins were also prepared for distribution to farmers.

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The decision early in the year to discontinue quarterly publications of the Farm Journal was revoked, and three issues of the Journal were prepared viz. June, September and December.

Departmental exhibits were displayed at the Union of Local Authorities' Exhibitions at Vreed-en-Hoop and Fort Mourant, and also at the Skeldon Estate Community Centre Exhibition and the League of Coloured People's Exhibition. In addition, an exhibit on Nutrition in British Guiana was designed by the Information Division for display at the First Caribbean Nutrition Seminar which was held in Puerto Rico. Crops and livestock competitions were held in conjunction with the Union of Local Authorities' Exhibitions.

Services to Farmers:

Selected agents continued to serve as distributors for stocks and fertilisers and to a limited extent insecticides and fungicides. In some of the riverain areas where satisfactory agents were unavailable, the Field Assistants continued to supply farmers with these materials. Veterinary supplies and vegetable seeds continued to be distributed by Field Officers. Soil Samples and specimens of diseased plants and animals were also collected by Field Officers and forwarded to the Specialist Officers for analysis, advice and diagnosis. In this respect, it is of interest to note that there is a steadily increasing demand by farmers for this service, and officers are finding it difficult in some cases to keep up with the demand for soil sampling. Other services rendered by Field Officers include, castrations, vaccinations, veterinary first aid and organising posts and disease control programmes.

Pure Line Seed Paddy

Despite the drive to improve the quality of milling paddy, the distribution of pure line seed paddy was disappointing. Details of distribution, through the Extension service were as follows:-

Berbice	9,389	bags	of	140	lbs.	each.
East Demerara	7,702	"	"	"	"	"
West Demerara	172	"	"	"	"	"
Essequibo	694.6	"	"	"	"	"
Mahaicony/Abary Rice Development Company	100	"	"	"	"	"

The marked increase in distribution in the Berbice district (3,884.5 bags in 1960) was due mainly to utilisation in the Black Bush Polder Scheme. Here, and estimated 17,000 acres were planted for the Autumn crop, and the settlers

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according to their terms of settlement are required to use pure line seed paddy. The selling price to farmers remained the same i.e. $9.55 per bag of 140 lbs. after winnowing, cleaning and drying. The main variety distributed continued to be D110 and No. 79. Small quantities of the new varieties No. 6044, 6036 and 6060 were distributed to selected farmers throughout the country. The total distribution of these varieties was estimated at 326.07 bags of 140 lbs.

Distribution of these varieties was as follows:-

District	Varieties - No. of bags of 140 lbs. distributed			
	6036	6044	6047	6060
Essequibo	4	23	13	11
East Coast Demerara	26	50	51	34
West Coast, Demerara	-	6	10	1
Berbice	19	25	31	20
Total	49	10	105	66

A large portion of the seed paddy at Anna Regina could not be purchased as pure line seed paddy grade because of the high red rice content. In addition to the above, 132 bags of seed padi were produced under the approved growers scheme.

Co-operative and Thrift and Credit Societies, especially on the Land Settlement Estates, continued as the main agents through which pure line seed paddy was sold to farmers on credit.

The treatment of seed paddy with aldrin, and with an organo mercuric compound to control rice water weevil and Helminthos-porium oryzae was continued. Despite the claims of the beneficial effect of this treatment, the sale of treated seed paddy, especially with respect to affected areas, was disappointing.

The new seed paddy bond at Lesbeholden in the Black Bush Polder Settlement was completed, and used for the storage of the Autumn Crop Seed Padi, which was produced exclusively by the Department of Agriculture. This operation had tobe reluctantly undertaken, as settlers of the Black Bush Polder, unlike those at Anna Regina, and Cane Grove, refused to produce Pure Line Seed paddy under supervision of the Department. 435 acres were planted but only 3,637 bags of 140 lbs. were produced. This low yield was due mainly to unavailability of combines at harvest time,

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in addition to the reluctance of the labourers to cut by hand because of fear of being bitten by rattle snakes.

Economic Plants.

The Production of clonal and hybrid seedling cocoa, coconut, citrus, avocado pear, mango and sundry tropical fruits was increased and de-centralised to meet the increasing local demands. Although the situation has improved considerably, the supply of planting material especially of mango, lime, oranges, avocado and certain tropical fruits was still lagging behind demand. Production however has been expanding steadily to cope with the ever-increasing demand.

Breeding Stock

The Department of Agriculture was forced to suspend hatchery operations due to an outbreak of pox despite vaccination precautions. Fortunately a satisfactory supply of both broiler chicks and chicks for egg production was maintained by the franchised and other hatcheries, Withthe present trend in chick production, the prohibition of importation of commercial chicks may have to be recommended.

The supply of weaner piglets for breeding though better than last year was still unsatisfactory, as farmers continued to rely almost solely on the Department of Agriculture for their supply of piglets. Field Officers persisted in their efforts to encourage selected farmers to produce weaner piglets for sale in the districts, but the subsidised price of piglets sold by the Department was hampering this project. Small supplies of weaner piglets obtained from the Mazaruni Prisons, the Demerara Bauxite Company Farm and the Essequibo Boys' School were used to augment the Department's production.

The demand for other classes of livestock viz. dairy heifers, milch goats, and sheep continued also to be in excess of production. There were demands for rabbits for Young Farmers and 4H projects, but local supplies were almost non-existent. In addition to distribution under the revolving heifer scheme, breeding stock were sold at the Central Agricultural Station from time to time to selected farmers.

The following tables summarises the quantities of agricultural materials produced by the Department and distributed to farmers by the Extension staff.

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TABLE XIV

Distribution of Economic Plants.

Station	Planting Material No. Sold					
	Coconuts	Citrus	Cocoa	Avocado Pear	Mango	Other Economic Plants
Central Agricultural Station	72,303	-	-	-	-	-
Botanic Gardens	-	749	-	640	215	4,758
District Stations	55,919	11,106	7,075	-	-	-
Central Horticultural Station.	-	22,257	63,758	-	-	-

TABLE XV

Distribution of livestock & vegetable seeds

District	Chicks	Piglets	Sheep	Goats	Revolving Heifer	Vegetable Seed Packets
Herbice	8,814	75	1	2	4	5,528
East Demerara	4,732	29	7	-	12	1,659
West Demerara	2,300	47	1	-	6	943
Essequibo	3,802	113	1	1	8	1,556
North West District	1,233	37	-	-	9	540
Rupununi	253	-	-	-	-	-
Total	21,134	301	10	3	39	10,236

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The following table shows bonuses paid by the Extension staff to farmers.

TABLE XVI

Incentive Bonus Payments

DISTRICT	CROP (ACRES)								
	Coco-nuts	Cocoa	Black eye Peas	Dhall	Pea Nuts	Mung	Pasture & Fodder	Cabbage	Onion
Berbice	105.0	5.0	84.0	-	-	8.5	-	-	0.25
East Demerara	138.5	17.0	10.0	-	-	-	74.0	2.5	-
West Demerara	2.0	9.5	2.0	-	-	-	5.0	-	-
Essequibo & Interior	421.0	2.0	55.75	1.0	38.5	-	41.0	-	-
North West District	42.0	1.0	7.0	31.0	9.0	-	-	-	-

Duty-Free Petrol:-

The issue of petrol under this scheme was continued, but on a much stricter basis with a view to limiting its abuse. Field Officers complained strongly of the time they have to devote to this regulatory duty. Time which could be spent more profitably in the field in securing greater and more efficient production.

Details of distribution for the past three years were as follows:-

TABLE XVII

Item	Year (gls)		
	1959	1960	1961
Rice	531,580	598,825	532,105
Sugar Cane	96,437	78,332	53,192
Ranching	4,725	6,040	9,345
Other	6,195	5,425	2,310
Total	638,937	689,022	596,952

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Local Authorities:

The Extension Staff continued to maintain close relations with all Local Authorities, to assist in community development work and to take an active part in self help projects. The Local Authorities, however, tend to shirk their responsibilities with respect to the Agricultural and Livestock exhibitions, and always try to delegate most of the work to the Agricultural Officer and his staff.

Regional Development Committees

Extension Officers continued as members of Regional Development Committees and area sub-committees. However, these organisations seemed to be declining in value and importance.

Machinery Hire Pools:

The Drainage and Irrigation Department continued to be responsible for the administration of these Pools, and the Extension Officers to serve as members of the area committees.

Crop Valuation:

The Drainage and Irrigation Department continued to employ a full time Crop Evaluator responsible to the Assistant Director (Extension) whose services were made available from time to time to the Public Works and other Government Departments. This officer was responsible for assessing compensation for crops on lands compulsorily acquired for irrigation, drainage, sea defence and other public works. Extension Officers were, however, called upon occasionally to check these valuations, and to act as referees in cases of dispute.

With the commencement of the Tapacooma project and the extension of the Parika-Mahaica Road, the checking and certifying of compensation claims were becoming a laborious task.

Agricultural Education.

The number of school gardens in operation at 31st December, 1961 was 113 i.e. an increase of one on the previous year. These were distributed as follows:-

District	No. of School Gardens at 31.12.61
Berbice	38
East Demerara including Georgetown	36
West Demerara	14
Essequibo	25
Total	113

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The number of schools in receipt of maintenance grants remained the same as last year viz. 55, and the amount received by these schools totalled $893.50 Only one (1) school received a grant amounting to $101.50 for the building of fences, purchasing tools etc., as this grant has been temporarily suspended. The Maria's Pleasure Canadian Mission School with a score of 88% was adjudged the best school garden in the Country, and was awarded the Bannister Shield.

The two (2) years' agricultural apprenticeship scheme was continued. Two (2) apprentices completed their course of training, two (2) resigned, one was dismissed and six (6) were appointed for the 1961 - 63 course.

Agricultural Information

With the return of the two (2) officers from the University of Puerto Rico, the work of the Information Division was stepped up - Work was started on the preparation of a number of movies on various agricultural subjects. In addition to the preparation of radio scripts, press releases, mimeographs, farmers' leaflets etc, this division was responsible for departmental exhibits for the various exhibitions already mentioned, and for the preparation of 'hand-outs' for Field Days, demonstrations etc..

Seminars on Communications and Visual Aids were held in Berbice, Demerara and Essequibo to assist the Field Staff in improving their technique of teaching farmers.

Rural Youth Work:

The past year was the sixth year of the rural youth movement and the beneficial effects of this programme, though simply demonstrated in some rural areas, will be increasingly revealed as club leaders and members begin to mature and to assume more civic responsibilities and to earn income from agriculture. The movement continued to maintain close collaboration with allied organisations viz. Social Welfare, Youth Council etc., but the availability of local leaders limited the progress of the Rural Youth Movement. During the coming year efforts will be directed in stimulating greater local leadership interest.

Several firms and individuals donated cups and other prizes for competition at the Youth Rally, and Achievement Day celebrations, and the Department is deeply appreciative of these gifts.

For the past year, thirteen (13) new 4H and one (1) Young Farmers' Clubs were registered. The following table shows a summary of the

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growth of the movement:

TABLE XVIII

Year	4H Clubs			Young Farmers' Clubs			Total Membership	No. of Adult Leaders
	No. of Clubs	Membership		No. of Clubs	Membership		4H & Y.F. Clubs	
		Boys	Girls		Men	Women		
1955	2							
1956	18	409	702	6	120	107	1,338	73
1957	22	439	749	9	104	130	1,422	99
1958	28	502	856	12	206	113	1,677	88
1959	36	585	1,001	12	174	106	1,866	136
1960	45	920	1,469	12	135	104	2,728	(101 me (130 w
1961	58	1,196	1,858	13	154	97	3,305	(120 me (152 w'

It will be observed that total membership has increased by close on 600 members, mainly in the 4H group. The upper age limit of this group was increased from 18 to 21 years so that in areas where there are no young farmers' clubs, members will be enabled to have longer perticipation in the youth programme.

These clubs were distributed throughout the country as follows:-

TABLE XIX

Area	No. of clubs		Total
	4H	Young Farmers	
East Berbice	10	4	14
West Berbice	4	-	4
East Demerara	14	1	15
WestDemerara	7	1	8
Essequibo Islands and Bartica	9	3	12
North West District including Moruka	5	-	5
Essequibo Coast	11	4	15

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It will be noted that Table XIX shows a total of 73 clubs in comparison with a total of 71 shown in the table giving number of members. The latter is based on the revised mid year enrolment of all clubs, and the former on clubs as at year end.

Every member of the Field Staff was expected to assume a certain amount of responsibility for Youth Work. The following table shows a summary of the activities of the Field Staff in Youth Work.

TABLE XX

District	No. of Clubs	Meetings Attended by A.O.'s and Asst. A.O.'s	Attendance	Meetings Attended by Home Economic Field Asst.	Attendance.	Meetings Attended by Co-ordinators	Attendance.	Meetings Attended by Field Assts.	Attendance.
E. Berbice	14	19	386	233	4015	45	828	132	2416
W. Berbice	4							108	2197
E. Demerara.	15	4	48	104	2526	78	1732	85	2014
W. Demerara.	8							77	1850
Essequibo Coast.	15	1	50	176	4142	67	1673	105	2469
Leguan & Bartica	12	11	225	109	3220			98	
N.W.D. & Moruka	5	6	196					57	

Project work, as usual, formed an important part of club work. In many instances home project work was supplemented by group project activities but the tendency was for more agricultural bias in project work. The latter was useful in teaching members to co-operate and also in assisting members without proper home facilities to participate in the programme. Group project was undertaken in gardening, home improvement, foods and poultry, and it is hoped to extend this idea during the current year. All project activities were climaxed with Achievement Day Participation.

The project activities were in the following fields:- (a) Gardening and Crops, (b)Livestock other than poultry, (c) Poultry rearing, (d) Beekeeping (e) Food, (f) Clothing, (g) Home Improvement.

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The following table gives a summary of the enrolment by project for both 4H and Young Farmers

TABLE XXI

PROJECT	4H			Young Farmers		
	No. enrolled July 1st.	No. of projects underway	No. of animals, hives, dishes, articles etc.	No. enrolled July 1st.	No. of projects under-way.	No. of animals hives, dishes articles etc..
Dairy Cattle	77	30	47	23	17	26
Milch goats	20	13	18	5	2	4
Pigs	40	17	26	11	2	6
Poultry	492	162	757	58	33	558
Sheep	53	30	53	3	1	1
Bees	27	6	13	4	6	
Gardening	752	286				
Clothing	1,108	856	2,925	55	110	351
Foods	1,148	579	2,480	181	84	358
Home Improve-ments	291	262	407	82	54	137

The total number of members enrolled in projects was:-

		4H	YF
Boys	-	1,051	154
Girls	-	1,625	97

The number of project leaders was as follows:-

		4H	YF
Male	-	104	17
Female	-	142	10

4H Rally:

A rally was held for the first time from April 12th to 14th in Georgetown at the B.G. Teachers' Training College Pavilion. The colony wide final was held for all the Demonstration and Judging Contests, there being 19 in the former and 26 in the latter. 51 representatives (including leaders) attended.

Tractor Rodeo:-

The second annual tractor rodeo or tractor contest was staged by the No. 48 Young Farmers' Club. Farm machinery and motor oil companies took an active interest in the Rodeo, presented prizes and loaned equipment,

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Cane Farming.

The Cane Farming Officer continued to serve as an ex officio member of the Central Cane Farmers' Committee, and to maintain close and constant contact with peasant cane farmers.

The Standard of husbandry practised by peasant cane farmers still left much to be disired. Apart from an isolated attempt at flood fallowing, and the tendency to replace old varieties with the recommended variety viz. B41227, peasant cane farmers did not show much improvement in their standard of cane cultivation. Moreover, despite their vociferous agitation during the past years for permission from the owners of sugar factories to plant more cane, only 108 new acres were planted in response to the agreement between Government and the Sugar factories for an extension of some 1,700 acres in peasant cane farming.

Sulphate of Ammonia was the only fertiliser used by the East Demerara peasant farmers, and the total quantities issued through the sugar Plantations on credit, was 2,285¾ bags (1 cwt. each). The rate of application was estimated at 2 - 3 cwt. per acre.

Beekeeping:

The unspectacular slow annual increase of beekeeping was maintained. The Department continued to give special service to beekeepers through the activities of the Field Assistant (Beekeeping), the maintenance of a model demonstration apiary and queen production unit.

The following table shows the position of the industry:

Number of	THE COUNTY OF						TOTAL	
	Demerara		Berbice		Essequibo			
	1960	1961	1960	1961	1960	1961	1960	1961
Beekeepers	222	243	78	85	52	52	352	380
Apiaries	251	272	86	100	58	52	395	424
Colonies (Supered & Nuclei)	1178	1222	470	491	462	458	2110	2171

The Botanic Gardens Demonstration Apiary continued to produce mated queens and Nucleus hives for sale to beekeepers. Distribution for the year was :-

	1960	1961
Mated Queens	99	137
Nucleus hives	53	65

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With a view to improving the quality of the bees at this apiary, four (4) tested pure-bred Italian queen bees were imported from the U.S.A., and successfully introduced and put into service as breeding stock.

The bee officer continued to maintain constant contact with schools and beekeepers through the Beekeepers' Association, and by visits to apiaries. The number of schools with hives was increased from 23 to 27. The Bee Officer and his assistant paid 505 visits to beekeepers as compared with 453 the previous year. Exhibits were also prepared for the Union of Local Authorities' Exhibitions at Berbice and Essequibo. At both, emphasis was placed on attracting beginners and boosting the industry.

Agricultural Demonstration Stations and Nurseries:

Demonstration stations and nurseries were maintained in the major agricultural districts, and their activities are briefly described hereunder:-

No. 63 Station:- The following table shows the distribution of planting material by this station:-

TABLE XXII

Item	Produced at Station	Shipped in from Other Stations	Total Demonstration
Coconut Seedlings	12,328	7,706	20,044
Orange (budded)	682	985	1,677
Grapefruit (Budded)	180	586	766
Limes (Budded)	37	215	252
Avocado	5	-	5

Coconut seedlings continued to be in brisk demand, and a total of 30,000 seedling nuts were set.

With a view to assisting and teaching farmers about citrus cultivation on the riverain areas, a 4 days' course was held at this station. Fifteen (15) farmers attended the course.

Aim:

The work at this station was concentrated on the production of citrus planting material for distribution to farmers. Production and distribution was as follows:-

/63. . .

Quantity of seeds sown - 6 lbs.

No. of seedlings planted - 533 lbs.

This station was closed at year end in order to centralise the work at Schepmoed.

Schepmoed

This station was satisfactorily maintained throughout the year, and was serving a useful purpose as a demonstration for the settlers. With the exception of a number of seedling lime plants which were attacked by gummosis and had to be destroyed; the citrus plants at this plot were being satisfactorily established. The cocoa under both planted and natural shade made satisfactory growth. The temporary shade plants viz. banana, plantain etc., and the incentive bonus crops grown for demonstration gave satisfactory yields.

In addition, small trials were carried out with different varieties of kenaf with the possibility of using this crop for fibre production by settlers. 35 black pepper plants were established at the Station for demonstration purposes, and 105 cuttings propagated for distribution to settlers.

Onverwagt:

This is a coconut demonstration station of 12 acres. Plants thrived and farmers showed interest in putting similar land - sandreefs near to the sea - under this crop. A colony of bees was also established at this station.

Garden of Eden

This station serves as a demonstration to settlers, as well as for providing technical information on pastures and selected crops growing on pegasse soils.

The fodder plot which was planted mainly with Para (5 acres), and to a lesser extent with Elephant, Guatemala and Guinea produced an abundant supply of fodder for the cattle on the station, and also for the distribution of planting materials to the settlers. There was also a $1\frac{3}{4}$ acre section of Pangola grass which also did very well.

In the pasture section ($7\frac{1}{2}$ acres), the Locuntu grass (Ischaemum timorense), grew very vigorously, and it was interesting to note the shrinking

/64. . . .

and compaction of the pegasse which resulted from grazing and improved drainage. It is estimated that over a period of two (2) years, shrinkage was about 18 (eighteen) inches or more in some places. The management of pastures under these conditions is now receiving attention, as there was a tendency to over grazing in some sections. The total number of animals at the station at 31.12.61 was thirteen (13), and these were all maintained in good condition from grazing and cut fodder. Three animals calved. In view of the poor quality of these cattle, it is hoped that their progeny - the product of Artificial insemination would give good milk production.

The crop section of this station was satisfactorily established. The citrus plants and the inter-planted crops of banana, plantain, cassava and other food crops grew satisfactorily. Some of the citrus plants were coming into production, and the inter-planted crops were gradually thinned out, after having given good yields.

Charity:

The nursery was maintained on a very limited scale due to the lack of interest in coffee cultivation, resulting from the low prices prevailing throughout the year. Only 538 coffee seedlings were distributed for 1961 as compared with 1,208 for 1960.

La Belle Alliance:

Propagation and distribution were as follows:-

(a) Coconuts

Number of seedlings distributed	19,972
Number of nuts set (for distribution 1962)	17,500

(b) Citrus

No. of citrus seedlings planted	11,400
No. of seedlings budded	3,600
No. of plants available for distribution at 31.12.61	200

(c) Cocoa

No. of plants propagated	1,000
No. of plants distributed	4,957

The citrus orchard for the supply of scion material was maintained in a satisfactory condition.

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Heria's Lodge and Suddie Nurseries:-

Propogation and distribution were as follows:-

(a) Citrus

No. of seedlings planted	6,503
No. of plants budded	4,275
No. of plants distributed	3,041
No. of plants on hand for distribution 31/12/61	150

(b) Coconuts:

No. of nuts set	7,753
No. of seedlings distributed	5,933

rtica

The citrus orchard for demonstration and the supply of scion as maintained in good condition.

The incentive bonus crops viz. peanuts, dhall, castor-oil and lack eye were grown at the station for demonstration and fertiliser trials ere also carried out. With the exception of peanuts, the results were isappointing. A yield of 1,846.01 lbs. of peanuts was obtained from fertilised plot.

There was a demand by several farmers for avocado plants, hich could not be supplied from the Botanic Gardens. In order to meet his demand, 200 avocado seedlings were planted with a view to grafting at he station. A limited production of budded citrus plants is also done.

Mosororo Maintenance works, application of fertiliser etc. were carried ut on the cocoa, citrus, coffee, avocado pear and coconut cultivations. ork on the vegetable garden plot was restricted by the shortage of irriation water, but it nevertheless served for demonstration and instruction or 4Hers and pupils of the Mosororo School.

The citrus cultivation, especially the young plants of about 5 acres were severely affected by the long dry weather and by acoushi nts from the surrounding forests. The citrus crop, especially that at the nd of the year was very satisfactory. A fair portion of the crops, however, was lost due to inadequate marketing facilities.

The avocado crop was poor, and despite the small harvest, ifficulty was experienced in marketing.

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With respect to coffee, 1/3 acre each of Liberica, Robusta and Arabia was planted on swamp land, and inter-cultivated with dhell. Five (5) acres on the hill were lined for clearing and to be planted with Robusta coffee.

The following is a summary of the propagation work carried out:-

A. Cocoa

(i)	No. of cuttings propagated	36,653
(ii)	No. of plants basketed	17,602
(iii)	No. of plants supplied to the station	4,836
(iv)	No. of plants distributed to farmers	2,118
(v)	No. of plants on hand at 31/12/61	17,628

B. Citrus

(i)	Seeds sown	48 lbs.
(ii)	No. of plants budded	3,870
(iii)	No. of plants distributed	4,774
(iv)	No. of plants available for distribution.	5,134

The sour orange root stock suffered from a severe attack of scab, and despite spraying with perenox, and other control measures, a large number of seedlings was destroyed. The control measures have been revised, and it is hoped that better results will be obtained during 1962.

C. Avocado

(i)	No. of seedlings planted	2,000
(ii)	No. of plants grafted	1,800

These will be available for distribution during May - June 1962.

D. Coffee

(i)	No. of Robusta seedlings planted	2,500

These should be ready for distribution during May - June 1962.

In keeping with the development programme for the station, the following were the main works carried out:-

(a) A twelve (12) acre field cleared and planted with hybrid cocoa seedlings - Dhall and other overhead shade were also planted.

(b) A store-room 30' x 75' was constructed.

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(c) A 10' x 20' (Samoan type) cocoa Dryer was erected.

(d) A 60' x 40' concrete floor was laid in one of the sheds

(e) A new hardening shed was erected.

The small dairy herd was maintained and seven calves (4 bulls and 3 heifers) were born. Milk production recorded for the year was 19,897 pints.

Two (2) sows on the station produced two litters each during the year. Sixteen piglets produced at the Station were distributed to farmers.

Kumaka-Quebana:- Establishment of the demonstration station on the Kumaka-Quebana Road was continued. The caretaker's house was completed and occupied by the caretaker.

Following a visit by the Honourable Minister of Natural Resources early in the year, it was decided to supply coconut seedlings to farmers on credit against their incentive bonus payment. 4,250 coconut seedlings were distributed to settlers. Red Ring disease was discovered in seedlings on the station, and as result 3,000 seedlings had to be distroyed.

A small nursery was being established at this station for the production of Robusta coffee seedlings for distribution in the district.

Land Settlement Schemes

The Department of Agriculture continued to be directly responsible for the Agricultural Advisory service on some 60,000 acres of Land Settlements. Agricultural Field Assistants were stationed at Black Bush Polder, Mara, Cane Grove, Garden of Eden and Anna Regina. As soon as additional staff becomes available, an agricultural officer and two (2) more Field Assistants will be stationed at Black Bush Polder. Field Assistants will also be stationed at Windsor Forest and Vergenoegen.

The hand over of the management of Cane Grove, Garden of Eden, Windsor Forest, La Jalousie and Vergenoegen to the Settlers was completed. Management Councils were organised to take over the supervision of these settlements pending their organisation into Local Authorities. The move has imposed an increased burden on the Extension Officers, to whom settlers now turn for advice and help even on matters with no apparent connection to agriculture.

The Vergenoegen Rice Mill continued to be managed by a Co-operative, and at Black Bush Polder registered Co-operatives were organised in order to be responsible for loans to purchase seeds and fertilisers and to operate combine harvesters, and rice mills. At the other Land Settlement

Schemes, Co-operatives were established on a varying basis but by and large for the purchase of planting material and fertilisers. It is regretable to note that in most instances, these co-operatives failed to function satisfactorily.

Pure Line Seed Paddy was cultivated at Cane Grove and Anna Regina by the settlers under the supervision of the Department of Agriculture. At Black Bush Polder, settlers were reluctant to undertake the production of Pure Line Seed Paddy and as a result, the Department of Agriculture had to cultivate 435 acres for the production of pure line seed. Unfortunately, due to lack of harvesting facilities only 3,637 bags were produced.

At Cane Grove, fifty-five (55) farmers planted pure line seed padi as follows:-

D 110	-	87.5 acres
No. 79	-	200.25 acres.

Due to unfavourable weather condition, production was only 3,500 bags (140 lbs. each). At Anna Regina, the production of seed paddy was as follows:-

(i)	Pure line seed paddy	-	2033 70/140 bags
(ii)	Grade A seed paddy	-	3844 70/140 bags

At Black Bush Polder, 17,000 acres were planted and the estimated yield was 130,732 bags (140 lbs. each.) of padi. A large portion of the crop remained unreaped. At Mara, 1,215 acres were planted and the estimated yield 9,072 bags. Here 200 acres were left unreaped. At the other Land Settlement Schemes, however, the condition was not as unsatisfactory.

Blast disease was observed on rice cultivation at Black Bush Polder, Mara and Vergenoegen, and control measures were successfully carried out by spraying with an organic mercuric fungicide.

VETERINARY SERVICES AND ANIMAL HUSBANDRY

Organisation

The Veterinary and Animal Husbandry Division is staffed by the Assistant Director (Veterinary), five Veterinary Officers with one or more Technical Assistant attached to each Officer. There were two vacancies for Veterinary Officers throughout the year. A new Officer was recruited in December but another Officer resigned in September. The staff .

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continued to work under severe pressure which was further accentuated by an outbreak of foot and mouth disease in the Rupununi in August. The services of a Veterinary Officer from Trinidad, West Indies, and another from the Ministry of Food and Agriculture in United Kingdom, were sought and obtained for work with the foot and mouth disease. It is most important that immediate steps be taken to alleviate the present condition and to afford the livestock industry the protection it needs for proper development. As a result of the outbreak of foot and mouth disease, the programme of work of the entire division was disrupted since an additional Veterinary Officer as well as field assistants and technicians (used as vaccinators) were detailed to the area.

A veterinary Officer was stationed at St. Ignatius Livestock Station for the Rupununi area, one at Central Agricultural Station for East Demerara and one at Georgetown for Central and West Demerara. Two vacancies exist one for a Veterinary Officer in Essequibo and another for Berbice.

The function of the Veterinary Officer in a district is to diagnose and treat animal diseases and to take measures to control and prevent the spread of infectious and contagious diseases, by prophylactic inoculations, isolations, restriction of movement and by slaughter where necessary. Each district has a small laboratory. In addition the Field Assistants of the Extension Staff undertake the treatment of minor ailments and first aid. Veterinary Officers also advise on animal husbandry and nutritional problems and matters of extension among livestock farmers.

The animal breeding policy of the Department is carried through by the Veterinary Division and the Veterinary Officer stationed at Central Agricultural Station undertakes the direct supervision of the Stockfarm where the breeding stock are kept.

It is anticipated that this responsibility will pass to a trained animal husbandry man in the near future. There is already established within the Division a section which is collecting information based on Artificial Insemination with a view of progeny testing. Farmers are also being educated in keeping records and to appreciate the value of such records.

The Artificial Insemination Service is based at the Central Agricultural Station where the bulls are kept. Semen is collected, prepared and shipped from the Station to various districts over the entire Coastal belt.

Another section in the Division deals with poultry. The Department's Poultry Officer maintained close contact with the poultry industry

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in the broiler and egg production fields. Pullorum testing is underteken by the Department and has made considerable contribution to the industry in that the incidence of pullorum was negligable during the year.

ANIMAL HEALTH

Foot and Mouth Disease

The outstanding problem for the year was the outbreak of Foot and Mouth disease in the Rupununi savannahs which has been endemic in the Rio Branco Territory of Brazil adjacent to our Rupununi District. British Guiana has always been free on the coastal belt but this disease occurred in the Rupununi 19 years previously. The outbreak was quite widespread but very slow in spread because of the sparseness of population. The whole area was placed under quarantine, meat shipments suspended and movement prohibited. Type A Valle was diagnosed and vaccination was carried out using a bivalent (A O) vaccine from Columbia. A live virus trial involving 4,000 animals was also conducted under the guidance and direction of the Pan American Foot and Mouth Disease Centre at Rio De Janiero At year end the disease was virtually under control, no new cases having been seen for 10 weeks and a total of 26 thousand animals had been vaccinated. A second round of vaccination is to be done early in 1962.

The Pan American Foot and Mouth Disease Centre of Rio de Janiero gave considerable help on the campaign against the disease and this is gratefully acknowledged.

Paralytic Rabies

This continues to be an important disease and responsible for a great number of deaths. However, the incidence in 1961 was very much reduced from the previous year. 1961 was a very low rainfall year and this is believed to be responsible for the lower incidence - particularly in the Rupununi where the cattle retreat to the foot hills when the savannahs are flooded. The bat populations are mainly to be found in the vicinity of the hills. Vaccination campaigns of previous years also have borne fruit.

Brucellosis has become a problem among diary cattle for the first time. Testing and vaccination with strain 19 vaccine have been instituted. Staffing shortage will embarrass the programme which includes blood testing.

Swine Erysipelas was widespread - the most serious problem among pigs. Vaccination and prompt treatement have helped considerably.

Chronic Respiratory Disease was widespread. Overcrowding by the broiler producers, to take advantage of the beef shortage (due to foot and mouth disease in the Rupununi) resulted in the appearance of this condition everywhere.

Other viral and bacterial disease encountered include Newcastle disease, fowl pox, anthrax, tuberculosis, pullorum, mastitis and tetanus

Protozoal Diseases

Anaplasmosis and Piroplasmosis were regularly encountered and treated successfully for the most part.

Trypanosomiasis occurred in horses in the Rupununi where the condition of 'Mal de Caderas' is often encountered.

A trypanosome was seen in a calf in the coastal area (only once before seen in a bovine on the coast - about 8 years ago in Essequibo).

Parasites

Internal and external parasites were prevalent. Lung worm is encountered regularly. Treatment is generally successful.

VETERINARY RESEARCH

Work continued on the Liver Cirrhosis Problem on the Intermediate Savannahs where the problem is still grave at Waranama and Tubalay. Ebini has not had any apparent cases and post mortems of 130 cattle slaughtered have not revealed this condition.

Biopsy studies continued at Cambridge and at the University College of the West Indies in Jamaica and the fourth of quarterly biopsies series is to be made early in 1962.

Laboratory and Clinical Services

These were performed routinely at the laboratory on specimens of all sorts from animals in districts as well as many brought to the laboratory.

ANIMAL HUSBANDRY

The policy of the Department is to foster livestock production through its Extension Service. Veterinary Officers play a part in this extension work.

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The three Livestock Stations at Central Agricultural Station in Demerara, Ebini on the Intermediate Savannahs and St. Ignatius in the Rupununi made good progress. Ebini and St. Ignatius are concerned with research on beef production. The Central Agricultural Station works with dairy cattle, pigs, sheep goats and poultry.

Animal Breeding Policy

Dairy Cattle:

(i) "Grading up" of creole cows with pure bred Friesian bulls.

(ii) Selected ¾ bred bulls on cross breed females (selected on production and heat tolerance)

(iii) Imported pure bred Friesians to be selected on basis of heat tolerance and bred to (a) Bulls at (ii) and (b) Progeny tested Friesian bulls from similar environment in the United States of America (Louisiana) by the importation of frozen semen. A deep freeze cabinet has been installed and semen was imported. The cabinet holds at -84°C. Attempts are being made to freeze and store semen locally.

Beef Cattle: Santa Gertrudis, Sahiwal Zebus, American) Brahmins and Jamaica Brahmins.) and crosses

Pig: Large white (Yorkshire), Landrace and crosses.

Sheep: Improvement of local mutton types. Barbados Black Belly rams being used mainly on grade sheep of the same breed as well as Wiltshire Horn and Border Leicester.

Goats: British Alpine

Chickens (for eggs) Rhode Islands Reds and White Leghorns.

LIVESTOCK FARM (CENTRAL AGRICULTURAL STATION)

Cattle

184 Friesian heifers and 6 Brown Swiss Heifers have been imported from the United States of America. Many of the heifers are attaining

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maturity and several have been inseminated with imported Frozen Semen from the U.S.A. (See Breeding Policy above). Others are being inseminated with ¾ bred locally bred bulls. (selected) The Brown Swiss are the first of this Breed to come to British Guiana. Apart from these imports, 195 other cattle were maintained on the Livestock Farm. Of these 130 cows and heifers were Central Agricultural Station dairy farm animals comprising 11 bulls 52 cows 42 calves and 75 cows and heifers were in the Dairy Heifer Scheme. The Dairy Improvement Scheme had 175 heifers and heifer calves. 52 heifers and cows were sold to farmers while 23 heifers were handed out to farmers under the revolving scheme.

Sheep

The number of sheep on the Station at year end was 68. 50 lambs were born for the year. 5 rams were sold for breeding purposes.

Goats:

Bucks sold for breeding for the year numbered 5. There were 30 goats on the Station at year end.

Pigs

Breeding stock distributed for 1961numbered258 very many more than in 1960. Total of pigs on the Station at year end was 176.

Poultry

The flocks of Rhode Island Reds and White Leghorns at year end totaled 2,092 made up of 616 hens and cockerels and 1,307 chicks (young replacements).

150,342 eggs were produced, 50,888 were incubated.

25,268 chicks were distributed to the districts.

EBINI LIVESTOCK STATION

Improvement in the general standard of livestock was the outstanding feature of 1961. This was due to the increased calving percentage and more productive pastures. The first 5 months were particularly dry and experimental work was hampered. Rainfall for the year was 71.31 inches.

The Pastures

About 1,000 acres of pangola pastures are maintained, However, these need to be increased due to the rapid increase in the number of livestock. Pangola grass is nutritious, palatable, provides a good ground cover (binds soil and prevents erosion) and easily and quickly establishes itself.
The Stunting disease of pangola was observed. Caused by a virus,

/74. . .

It is characterised by stunting, short internodes and red and yellow colouration of the leaves. It is much more noticeable in the dry season. There is need therefore, to introduce resistant cultivars or new species of grass.

A few species are under trial. The most promising is Cynodon dactylon. It spreads rapidly, appears coarse but is not fibrous. It has not yet been subjected to grazing. It is expected to establish 15 - 20 acres during the rainy May - June period of 1962 from slightly less than one acre now propagated, when the effects of grazing and treading will be studied.

A small quantity of seed of the leguminous tree Leucaena glauca supplied by the Imperial College of Tropical Agriculture has germinated well and the plants are growing very well. The young trees are cut with a mower and as a result branch close to the ground - and the shoots may be grazed periodically by stock. These plants are to be used as shade trees and seed will also be collected. Some species of peas thought to be suitable for grazing are also being tried. Some forage bamboo plants (Dendrocalamus strictus and Bamburo ventricosa) said to do well on poor sandy soil and to have a high protein contents are also to be tried.

Planting of shade trees has continued but there has been a high percentage of casualties - due to damage by stock or death immediately after planting. "Gooseberry" is being tried, but the samaan is still the most promising.

Livestock

The cattle totaled 1,216 and comprised 33 bulls, 645 cows, 66 heifers, 78 steers and 394 calves. The calf crop for 1961 was 422 registered births with 28 unregistered births (Mummified foetuses, still births, prematures, dystokia with dead calves etc.)

The number of calves registered was 422. This was rather fewer than expected. There were also 28 unregistered birth; particulars of these are given in Table XXIV.

A considerable number of ½ bred and ¾ bred heifers are now available for drafting into the breeding herds and these are being put to the sires who have proved themselves on the original cows. The poorer cows being withdrawn are being put with young unproven bulls for progeny testing of these bulls.

/75.....

TABLE XXIII

Month	Number of Calves Born			Mean Wt.	Mean Wt.	Unregistered birth
	Total	Males	Females	Males	Females	
January	33	15	18	65.4	61.2	1
February	29	15	14	69.0	61.5	2
March	46	28	18	62.6	60.8	2
April	35	19	16	59.1	59.6	3
May	34	15	19	62.5	55.3	3
June	15	9	6	64.6	66.7	3
July	15	6	9	65.0	66.2	2
August	9	6	3	63.3	46.0	1
September	46	20	26	62.3	59.8	2
October	38	19	19	64.9	57.6	5
November	72	33	39	65.3	60.9	2
December	50	23	27	62.1	60.4	2
	422	208	214	63.9	58.9*	28

* means for all calves - not of monthly means.

TABLE XXIV

Unregistered Births

Particulars	Numbers	Remarks
Mummified foetus	1	
Deformed weak calves	1	
Still born but apparently normal	7	
Born alive, died subsequently	3	Includes calf which could not stand.
Premature	2	
Difficult calving cases where calf died	2	
Particulars unknown	12	All range animals; pregnancy though full term in all cases.

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There are six Santa Gertrudis single sire units, four Sahiwal Zebu units and two American Brahmin units. Individual mating is practised in two herds namely themilking herd of grade Freisian and a herd of pure bred Santa Gertrudis females.

There was considerable variation in the birth weight of calves. Lower weights in April and May may be related to the poor condition of pastures from December to May as a result of very dry conditions. Male calves were heavier at birth and through 300 days following.

The calving interval reduction reported the previous year continued. 267 out of 422 births were after an interval of a year and a half. There is a tendency for a good number of animals only to come oestrus after the calf is weaned.

EXPERIMENTAL WORK

Steer Grazing Trials

There were insufficient steers available for steer grazing trials to commence in January. One trial commenced in July was terminated in December due to unusual shortage of beef in Georgetown as a result of foot and mouth disease outbreak on the Rupununi Savannahs.

The steers were backward and undernourished at the start of the trial. They were grazed rotationally on 8 - 10 acre pastures of not very good quality since they were not highly fertilized. 42 steers within the age range of 12 to 18 months were used. Table XXV shows the summary of results of steers grazing Trial VI.

Progeny of Santa Gertrudis (177) and Sahiwal (35) - both from range herds did not do well. The weights of the Santa Gertrudis (200 animals)is also surprising since he has a fair number of progeny exceeding 600 lbs. at 360 days.

Study of liveweight changes calving intervals in breeding cows

Collection of information on the liveweight of cows, and calves, calving intervals etc. has been carried out in the Santa Gertrudis 'A' (200) herd. The composition of the herd, management etc. has remained unchanged. Information on approximately 200 calvings is being analysed by the statistician of theImperial College of Tropical Agriculture. Calvings are classified according to months in which they occurred. The following data are being examined:- calving intervals, liveweights before and after calving, the lowest liveweight, interval between calving and lowest liveweight

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TABLE XXV

SUMMARY OF RESULTS OF STEERS GRAZING TRIAL V1

Sire	No. of steers	Mean wt. July 1st 1961 (3 weighings)	Mean wt. December 1961 (3 weighing)	Live weight gain per lb/day
Santa Gertrudis 2	3	526.3	676.0	0.97
" " 177	6	323.3	412.5	0.58
" " 182	13	474.5	604.5	0.84
" " 200	14	460.3	584.9	0.81
" " 698	1	595.0	718.3	0.80
Sahiwal 35	2	322.0	378.7	0.37
Tobago Punch	1	456.7	597.0	0.91
C 1561	2	503.9	642.8	0.92

interval between these dates and conception, liveweight gains of calves.

Trace Element Deficiencies

No further major experiments have been carried out.

During the year the application of trace elements with fertiliser has been made to supplement the mineral mixture supplied. It is not yet known whether this can ultimately replace the mineral supplement.

Some selected animals have been receiving Zinc sulphate and Molybdenum trioxide added to their mineral mixture. Two herds have also been receiving a special mixture containing Zinc and Molybdenum. A 50:50 mixture with Churns High Phosphorus mixture and this special mixture has been fed to the bulls and to the pure bred selected Santa Gertrudis herd.

It is observed that the amount of mineral consumed varies inversely with condition of pastures. On poor pastures ½ lb. per head is consumed in 24 hours - on lush pasture this amount lasts for seven days.

Animal Health

There has been remarkably little disease. Of 100 animals slaughtered on the station - none showed cirrhosis of the liver. There were a few cases of joint-ill in calves which responded to treatment.

Internal parasites in a few calves have been encountered.

The incidence of abortions which was high in 1960 was not seen. The cause appears to have been nutritional.

ST. IGNATIUS LIVESTOCK STATION

The Station is run by an Agronomist and a Veterinary Officer. The Agronomist was on vacation from September to December.

The programme was seriously interfered with firstly by severe drought in the first 5 months of the year and secondly by an outbreak of Foot and Mouth Disease in August when cattle movements and recordings were suspended.

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Rainfall

The rainfall was less (56.42") than last year (67.21"). No rain fell through January - April and very little in May. The rains were later and more concentrated through June - August than in 1960.

Cattle

Condition of stock generally was good. Half bred Zebus continue to show better progress than half bred Santa Gertrudis. 91 calves were born during the year. Heavy loss in one herd particularly, is belived to be possibly caused by trypanosomiasis no confirmation has been obtained from the study of blood films.

One herd (Tabatinga) was infected with foot and mouth disease.

Breeding Programme Investigations

Since movements ceased in August, available figures are influenced as a result.

The average liveweights for cross breds from 6 months to 3 years old were as follows:-

Average live weights 6 months - 3 years

	6 months	1 year	2 years	3 years
Rupununi steers	-	-	438.0 lbs.	645.5 lbs.
Cross bred Santa Gertrudis steers	255.6 lbs.	411.2 lbs.	495.6 lbs.	630.0 lbs.
Cross bred Zebu steers	235.9 lbs.	435.4 lbs.	519.2 lbs.	660.0 lbs.

Total of 123 cattle considered

It is noted that growth rate is poor following weaning from 1 year to 2 years old, there is not much difference in weights between types at 3 years, and that the average daily weight gain is poor - ½ lb. per day for the first 3 years of life. There is probable slight correlation with rainfall when pastures are improved.

RESEARCH PROGRAMME

Utilization of Savannah grasses - (1) Rotational Grazing

3 - 50 acre paddocks were studied using 2 - year old steers stocking at the rate of 1 beast to 6 acres. Trace elemented high phosphorus mineral supplement was fed ad lib. Animals were weighed fortnightly.

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There was steady loss in liveweight gains even when the stocking rate was later halved. This work terminated with the advent of foot and mouth disease.

Fertilization and rotational grazing

1 - 50 acre paddock was fertilized at the rate of 2½ cwts. of a 1:1:½ mixture and mown in June when the rains started. A breeding herd was used for rotational grazing (10 - 14 days grazing 21 - 42 days recovery). Mineral supplement fed ad lib. Stock remained in good condition but the short June - August period was not sufficient to justify conclusions. This work appears promising.

Mowing and Controlled burning

Observations are being made on small plots (necessitated by difficulties experienced in previous years without proper firebreaks etc.) on the comparative effect of controlled burning with that of mowing to stimulate fresh growth of the major species.

Grass Introduction Trials

Acreages of introduced grasses were extended. These include Pangola (Digitaria decumbens) Guinea (Panicum maximum) and Jaragua grass (Hyparhenia rufa)

Both the latter established well and seeded. Pangola was not productive until the rains came in June and caused active growth in September. Good quality silage was made from pangola and there is every indication that hay could easily be made toward the end of the rainy season.

Calving Interval Studies

The following table shows the calving intervals observed for 57 animals.

TABLE XXVI

No. of Animals	Calving	Range in days	Average No. of days
25	2nd	301 - 1129	702
29	3rd	318 - 913	588
3	4th	327 - 656	477

Many factors including Foot and Mouth disease measures, rearranging of herds etc. combined to lower the value of these figures.

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FISHERIES DIVISION

The Division of Fisheries is organised in two sections, that of Research and of Extension.

Research

The staff comprised the Fishery Research Officer, who shortly after returning from vacation leave, was seconded as Fisheries Adviser to Togoland, and Honorary Fishery Research Officer (Dr. R. McConnell), technical assistants and clerks.

Fresh Water Fisheries:

The establishment of fresh water ponds stocked with Tilapia continued. Although the Agricultural Extension staff are principally concerned with this programme, it is supervised by the Fishery Officer. It is estimated that there are some 730 ponds, varying in size from about 100 square yards to 2 acres. However, Tilapia seems to have done best in the coastal brackish water swamps, from which large catches are made at certain times of the year.

Onverwagt Fish Culture Station

This station was completed in 1960. It comprises 57 acres of pond. 9,856 lb. of fish were cropped for the year. The species - fingerlings of which are collected from the sea at high tide and placed in the ponds - were mullet, snook, croaker, bashaw, grouper, and shrimp, in addition to Tilapia.

Ecological studies of the species were undertaken in order to determine matters such as:-

(i) The occurrence and abundance at particular spawning periods.
(ii) Conditions of spawning.
(iii) Predators
(iv) Food habits
(v) Growth rates
(vi) Raising of fry under nursery conditions.

Tilapia fingerlings were distributed from this station to fish farms.

Studies of seasonal distribution of fish species on the Georgetown Market.

Analysis of the records of fish purchased by the Government Wholesale Fish Market was continued to determine the seasonal distribution of fish caught by schooners, pinseine, and trawlers. Visits were paid to the Fish Market for a similar purpose. The following were the main findings:-

(a) The Government fish market purchased 38% of its fish from

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snapper schooners, 35% from trawlers, and 27% from pin seines.

(b) 86% of the fish landed by schooners was snapper. Next in importance was grouper and last was Dolphin.

(c) Queriman accounted for more than 50% of the landings from pin seine boats. The grey snapper and gnock accounted for 9% and 8% respectively.

(d) Croaker, bangamary and sea trout made up most of the catch of trawlers, and

(e) Catches by pinseine boats showed the greatest variation than those caught by other types of vessels.

Publications:

The Fishery Research Officer published a paper entitled "The fishes of the British Guiana continental shelf with notes on their natural history". The analyses of data and examinations of fish collections from the Rupununi district continued and a laboratory reference collection was prepared and despatched to the British Museum in connection with this work.

Fisheries Development and Extension work:

The expansion of trawling continued. Four local trawlers were in operation. An all-purpose fishing boat - built to the design of the Fisheries Division - was completed. This type of vessel might offer a possible new opportunity to fishermen who cannot afford to own trawlers. The vessel would engage in trawling, long lining and pin seine production. A bonus payment of 12½% of the value of new boats, built to an approved design is payable as a means of encouraging the expansion of the industry.

The refunding of duty paid on imported gear used in the industry continued to account for a good deal of the work of the Division. Duty was refunded on the following:- 75,733 gallons of petrol, 1,959 gallons of lubricating oil, 6,709 gallons of Dieselene, 10,340 lb. of twine, 1,562 gallons of pine tar, 877 gallons of coal tar; 6,264 lb. of rope, 499 packets of hooks, 1,756 yards of canvas, 1,014 gallons of copper preservative, 142 rolls of wire mesh, four pin seines, 44 outboard motors, and 3 inboard motors. This concession involving a subsidy of $43,976 to the industry, were of great help to fishermen.

The I.C.A. Fisheries Adviser devoted much effort to improving the refrigeration and fish handling facilities of the Wholesale Fish Market. The construction of ice boxes for storage of catches, and assistance given to private enterprise to establish modern fish shops in Georgetown were other activities which have made an important impact on the industry.

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Another attempt was made to secure the interest of fishermen in utilising the large number of sharks which occur in coastal waters. A shark liver oil extraction plant was installed at the Fisheries Dock. The extracted shark liver oil found a ready market locally, while 614 lb. of shark hides, fins and teeth were exported to the U.S.A.

The Fisheries Dock and Wharf at Georgetown were administered by the Fisheries Division. Several improvements were made including the introduction of an ice crusher, the sale of dieselene (in addition to petrol) from pumps, and extension of facilities for the preservation and drying of nets. The Fishermen's Lodge was in full use throughout the year.

The Fisheries Advisory Committee held several meetings and dealt with matters affecting the operation of the fish Market, as well as pertaining to the welfare of the industry in general.

THE AGRICULTURAL ECONOMICS DIVISION

Agricultural Census

The Agricultural Census scheduled to take place during the month of August had to be postponed until next year because of the General Elections. Preparatory work for the Census continued during the course of the year.

During the month of June the Agricultural Economist attended a conference of Regional Agricultural Census Officers held in Port-of-Spain, Trinidad. Various aspects of the Regional Agricultural Census were discussed. The last regional census of agriculture covering the territories now forming the West Indies, British Guiana, and British Honduras was taken in 1946. Our Census being a part of the Regional Agricultural Census, would be co-ordinated with those of the West Indies.

The planned Census will be a sample census. The distinct advantage in having a sample census over a completely enumerated census would be the considerable savings in the total cost together with a greater degree of soundness and accuracy as a result of more effective and closer supervision. The Census will cover approximately one out of every four of the enumeration districts of the Population Census of 1960. The enumeration districts and their respective boundaries would be the same as those used in the Population Census. The selected enumeration districts would be arrived at by random sampling.

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It has been many years since the Department has held an Agricultural Census. It is therefore hoped that the Census will provide meaningful information with respect to statistics of Agriculture.

The Department is taking necessary steps for the purpose of having an Ordinance passed to carry out the Census. It is hoped that this Ordinance when in effect will also cover the easy undertaking of the Annual Stocktaking and Agricultural Economic Surveys carried out by the Division. The Department has been experiencing great resistance on the part of farmers in respect to information of their farms, and it is hoped that with the adoption of such an ordinance the difficulties will be reduced.

Stocktaking of Agriculture

In view of the long intervals between agricultural Censuses, an annual stocktaking of agriculture was initiated. The main objective of the operation is to provide estimates on a village to village basis, it is intended that the extension staff with the co-operation of other rural agencies and estate proprietors would collect statistics on crop acreages, production and livestock numbers. The Statistics are recorded on a return showing crop, acreages under cultivation and the production thereof during the year.

Research

Ground Provisions . A Cost of Production study on certain ground provisions was done at the request of the Ministry. Surveys in this respect were carried out in the following areas:-

(a) Canal Polder, West Bank Demerara River.

(b) East Bank Essequibo River .

(c) Mara Land Settlement, Berbice River

(d) East Coast Demerara.

Altogether forty farms were visited in the above districts.

The survey did indicate that most of the farmers practised a very intensive type of farming. While in most instances plantains was the primary crop there were several other crops on the same land such as cassava, (eddoes in the case of lowlands) pumpkins and cucumbers. Because of the aforementioned factors (the growing of several crops on the same land space) two costs were reported,

(1) true cost

(2) economic cost

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The true cost did not recognise the existence of the vine crops while the economic costs recognised the existence of the vine crops as a standard practice.

Sugar Cane

A cost of production study was done for farmers' cane. The cost of production was done for acreages of one to fifteen at two levels of production. The study focused its attention also on the family contribution in the form of labour.

The surveys were carried out among peasant cane farmers in the East and West Demerara. The farms and farmers were selected at random.

Coffee

Surveys were carried out also to determine the cost of production per acre of coffee. The surveys were carried out in the Pomeroon and Canals 1 & 11. The total sample comprised of twenty-eight farms, fifteen in the Pomeroon and thirteen in the Canals. The survey revealed the relatively backward and primitive way of coffee cultivation in the colony; this was much more evident in the Canals Polder Region than in the Pomeroon. Yields in the Canals were comparatively low, approximately 37.5 percent lower than the Pomeroon.

Time-Cost Efficiency Survey of Mechanized Rice Farming

The above mentioned study-survey was carried out by the Division in several selected parts of the colony.

The areas selected in Berbice were as follows:-

(a) Crabwood Creek
(b) Bush Lot, Nos. 27 & 28, East Berbice.
(c) Bush Lot, West Coast Berbice.

The areas selected in Demerara were as follows:-

(a) De Kindren, East Demerara
(b) Vreed-en-Hoop, West Demerara

The areas selected in Essequibo were as follows:-

(a) Belle Plain, Wakenaam Island
(b) Maria's Pleasure, Wakenaam Island
(c) Anna Regina, Essequibo Coast.

The results of the study have given a fairly comprehensive assessment of the effect of mechanization and its cost to the industry. Such information is of significant value to the Department in assisting to understand

the growing aspirations of people to mechanise the industry. It will also assist the Department in its important Agricultural Credit Programme in computing costs.

Fishery Extension Project

During the course of the year the Agricultural Officer (Economics) was instructed to investigate and report on the economic soundness of the installations of a "Refrigeration Unit" - a Fishery Extension Project. (The Industrial Officer (Trade and Industry) provided the relevant information necessary to work out the economics involved).

A complete and comprehensive report was made on January 10th, 1961 giving also a complete analysis of cost and revenue in detail.

Economic Assessment of Peasant Holdings.

Studies in this programme are being carried out at the Garden of Eden Land Settlement, East Bank Demerara and the Mara Land Settlement on the East Bank of the Berbice River.

The studies are designed to give information on the economics of peasant farming. Weekly records were taken by the staff of the Economics Division. These studies will necessarily entail a few years of observation before conclusive results can be obtained. Although, almost a year's records have been taken, a thorough assessment is not possible because of the severe drought the Colony experienced during the early part of the year resulting in considerable losses.

Studies of this nature were done in Trinidad and in Jamaica also.

Agricultural Prices

During the year 1961 the Division of Economics produced a weekly report of prices received by farmers for ground provision, this report was forwarded weekly to the Government Information Services, who in turn disseminated such news to the press and radio. Consequently farmers were informed on most Thursday mornings of the prices received by farmers for their produce. The programme was well received by farmers all over the country, it equipped them with the necessary information of market conditions and assisted them greatly in marketing their produce at the right time. During the year prices on the whole were favourable. To some extent the drought which was experienced during the early part of the year resulted in a short supply of several commodities. The long dry season on the other hand was used by many farmers to do extensive clearing and placing new lands in cultivation. Prices

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received for all of the Ground provisions were in excess of the minimum price guaranteed by the Government Marketing Division.

Retail Prices.

During the year 1961 farmers and consumers were kept informed about current ruling retail prices in the Georgetown markets. The prices were heard on the programme, "Farmers Forum", over radio station B.G.B.S. Prices were submitted for all agricultural produce.

Other activities undertaken by the Division

The Division continues to collect, collate and supply all agricultural statistical information for the colony. Such statistical information is transmitted regularly to Government Departments, the Food and Agricultural Organisation and other international agencies.

During the year the Division made up the Food Balance Sheet for the colony at the Caribbean Nutritional Conference held in Puerto Rico.

Supervised Agricultural Credit

During the year, work was continued on the filling out of farm plans for the settlers at the Garden of Eden and Mara Land Settlements.

On account of the lapse of time between the submission of the original plans and the approval by the Board of the B.G. Credit Corporation these original plans had to be revised and again submitted to the Credit Corporation. However, on the 26th July the first set of applicants from the Garden of Eden Land Settlement received their intial advances and on the 21st September those at Mara received their initial advances.

At the end of the year 24 applications from Garden of Eden and 9 from Mara had been revised and submitted to the Credit Corporation. Thirteen of the 24 applicants from Garden of Eden and 5 of the 9 from Mara have been receiving loan advances. So far sums totalling $8,821.90 and $921.00 have been advanced to the settlers at Garden of Eden and Mara respectively. Nine farm plans for individual farmers were completed and submitted to the Credit Corporation for their consideration. One was for a beef operation, six for poultry enterprises and the remaining two for mixed farming. Of these 9 plans, only one has so far been granted and two are still under review. In one case the plan showed that the applicant did not need a loan. In another case the amount approved by the Credit Corporation was $3,000 less than the amount recommended by the Economics Division, and the applicant decided not to accept the amount approved by the Credit Corporation. The remaining four were

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rejected for reasons other than economic ones. The Economics Division also assisted four individual farmers with some advice on farm planning.

At the request of the Credit Corporation loan analyses were prepared for 12 loan applicants. Nine of these applications were for loans to buy tractors and three to buy combine-harvesters. Quite recently the supervision of loans for short-term bonus crops such as cabbage has been undertaken by the Department. So far 3 applications have been submitted to the Credit Croporation.

A three-day training course in Supervised Agricultural Credit was organised for those officers of the Credit Corporation and Department of Agriculture involved in the programme. One of the main results of this course was an agreement on the procedure of the processing of farm plans and the responsibilities of each of the departments taking part, i.e., the Credit Corporation, the Land Division of the Ministry of Natural Resources and the Department of Agriculture. In brief, the Department of Agriculture has assumed the responsibility of planning and supervising and the Credit Corporation that of disbursing and collecting loan funds. The Land Division are involved in so far as they are concerned in the administration of the Land Settlements. This agreement on procedure and responsibilities has since been signed by the heads of the three departments.

Through the courtesy of the I.C.A. some films on Agricultural Credit were shown to the settlers of Garden of Eden and Mara Land Settlements. This was accompanied by talks on the same subject - all in a drive to educate the farmers in the matter.

Mr. R.B. Gregg, I.C.A. Specialist in Rural Credit, was attached to the Division for the whole year and took an integral part in all phases in the establishing of the Supervised Agricultural Credit Programme

BOTANICAL GARDENS, GEORGETOWN

The Gardens - a major tourist attraction and place of recreation - were kept in a very attractive condition throughout the year. No major rehabilitation work was undertaken, but a considerable consolidation on previous work was made.

As in previous years the Gardens made big contributions to almost all festive and ceremonial occasions both directly by Floral Decorations being done by the staff and by the loan of material for organisations to carry out their own decorations.

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The gardens continues to offer vegetable seeds of known varieties for sale to the public. Sales of vegetable seeds for the year were:-

Mixed vegetable seeds		33,544 pkts.
Tomato	"	3,528 "
Onion	"	515 "
Cauliflower	"	156 "
Blackeye peas		630 "

Free distribution to various approved Government Institutions amount to:-

Mixed vegetables	1,122 pkts.
Tomato	127 "
Onion	43 "
Cauliflower	30 "
Blackeye peas	46 "

This shows a substantial increase in the quantity of this type of seed used in the country in 1961 as against that used in 1960.

Nursery

Propagation and Distribution of Plants

As in previous years both Economic and Ornamental plants were propagated in the nursery for sale to the public, in addition to those raised for use both in the Botanic Gardens and other Government Gardens and Schemes. The following were produced:-

Ornamentals

Annual and soft wooded seedlings raised and used in the Botanic Gardens and other Government Compounds only.	41,000
Soft and harded wooded trees and shrubs raised both for the Botanic Gardsn, other Government Gardens and for sale to the public.	13,500

Economic Plants

Miscellaneous economic plants raised by cuttings, grafting, ringing layering, seed etc. both for sale and use by the Government	8,850
Total of all plants raised by all means for all purposes in the Botanic Gardens Nursery	63,350

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The following plants raised in the Nursery were sold to the public:-

Ornamentals	8,220
Economics	6,545

Revenue from sales of plants and seeds at the Botanic Gardens:-

Seeds	$2,242.99
Plants, lilies etc.	4,785.95
Total Revenue received from all sources (Subject to Audit)	$7,028.94

METEOROLOGICIAL DIVISION

Records of atmospheric pressure, temperature humidity, sunshine, radiation-temperature, rainfall evaporation, and velocity of wind were taken at the Botanic Gardens, Georgetown; temperature, humidity and rainfall at New Amsterdam Gardens, Hoseroro Experimental Station, North West District, 72 miles Bartica-Potaro Road, and St. Ignatius, Rupununi; temperature, humidity, sunshine and rainfall at Anna Regina, Essequibo, and Mazaruni Prisons; records of atmospheric pressure, temperature rainfall and velocity of wind at Mabaruma, North West District; temperature, humidity, rainfall and velocity of wind Lethem, Rupununi, and Enachu, Mazaruni.

Rainfall records were also taken at 68 Stations situated within 15 miles from the coast viz. 19 in Berbice, 41 in Demerara and 8 in Essequibo, and 29 stations situated more than 15 miles from the coast.

Observations at the various stations are under the supervision of the following:-

Botanic Gardens:	Meteorological Observer and Assistants
New Amsterdam Gardens	The Agricultural Officer;
Anna Regina, Essequibo	The Post Master;
Hoseroro Experimental Station:	The Agricultural Officer;
72 miles Bartica-Potaro Road:	An officer of the Public Works Department;

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Mazaruni Prisons:	Two officers of the Prisons Department.
Mabaruma:	An Officer of the Tele-Communications Department.
St. Ignatius Experiment Station	The Agricultural Officer.
Lethem, Rupununi	An officer of the postal Department;
Enachu, Mazaruni	An officer of the Tele-communications Department.

Close contact was maintained with the Director of the West Indies Meteorological Service, Trinidad, to whom monthly reports are sent. The Director and Staff gave technical advice and undertook the adjustments of instruments.

Weather

Reports are sent twice daily by radio to the headquarters in Trinidad and a daily weather forecast for the Georgetown area is publicised by radio and newspaper.

SECTION III

L E G I S L A T I O N

Summary of Legislation affecting Agriculture Enacted during 1961.

Orders in Council	Purpose
1. Animal Diseases Ordinance	To revoke the Animal Diseases (Paralytic Rabies, Order No. 10 of 1961).
2. Animal Diseases (Prohibition of Importation)	To provide for the importation of horses from the United Kingdom.
3. Animal Diseases (Prohibition of Importation) (Wild Carnivores)	To provide for the importation of a lion cub from the United States of America.

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SECTION IV

(1) BOARDS AND COMMITTEES - 1961

The Director of Agriculture serves as Chairman of the following Boards and Committees:-

(1) Sugar Industry Price Stabilisation and Rehabilitation Funds Committee;

(2) Sugar Experiment Station's Committee;

(3) Ad Hoc Fisheries Advisory Committee

(4) Steering Committee for the establishment of a Biological Research Institute.

(5) "Ad Hoc Committee to consider Revision of the formula for determining the price paid for farmers' cane".

The Director also served as a member of the following Committees:-

(1) British Guiana Rice Marketing Board.

(2) British Guiana Rice Marketing Board - Executive Committee

(3) British Guiana Rice Development Co.

(4) Selection Committee for I.C.T.A. Scholars.

(5) Dayson Memorial Fund Committee.

(6) Museum Committee (Board of Trustees for the Georgetown Cultural centre).

(7) Rice Producers' Association.

(8) Committee to advise on the Black Bush Polder.

(9) International Commission on Drainage and Irrigation - National Committee.

(10) Committee to investigate the Policy for the establishment of improved Multi-stage rice milling.

(11) B.G. Soil Survey Advisory Board - Vice Chairman

The Director of Agriculture attended the following meetings outside the Colony:-

3rd Meeting of Regional Natural Resources Council - Jamaica.

F.A.O. Meeting on Dairy Problems in Latin America - Sao Paulo.

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Meeting of the W.I. Cane Farmers' Association - Barbados.

Mice Conference - Trinidad.

F.A.O. Meeting - Rome

(11) SENIOR STAFF CHANGES

The following changes of staff occurred during 1961.

Appointments

H. Paul	-	Deputy Director of Agriculture
O.F. Churaman	-	Assistant Director (Administration and Development).
E.C. Ho-Yen	-	Assistant Director (Research)
C.B. Ching	-	Agricultural Officer
M.W. Fisher	-	Agricultural Officer
R.S. Persaud	-	Veterinary Officer
C.A. Vieira	-	Agricultural Officer (Acting)
J.A. Dummett	-	Agricultural Assistant
A.V. Downer	-	Agricultural Assistant
P.O. Jackson	-	Agricultural Assistant
W.A. Bovell	-	Agricultural Assistant
A.L. Agard	-	Agricultural Assistant
C.G.M. Shaw	-	Agricultural Assistant (on secondment)
C. Bannister	-	Agricultural Assistant (acting)
S.L. Broome	-	Agricultural Assistant (acting)
C.G.M. Shaw	-	Senior Field Assistant
A. Ho-a-Kam	-	Senior Field Assistant
H.L. Morrison	-	Executive Officer (acting)

(iii) SENIOR STAFF AT 31ST DECEMBER, 1961

Director of Agriculture	-	G.B. Kennard, D.I.C.T.A., A.I.C.T.A., Dip. Agric. Econ.
Deputy Director of Agriculture	-	Dr.H. Paul, B.Sc., M.Sc. (McGill) Ph.D (Lond.), D.I.C., F.R.I.C.
Assistant Director (Administration and Development)	-	O.F. Churaman, D.I.C.T.A.
Agricultural Officer, (Headquarters)	-	H. Madramootoo, B.S.A., M.S.

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RESEARCH AND LABORATORIES

Assistant Director (Research)	-	B.O. Ho-Yen, M.Sc., D.I.C.T.A., B.Sc. (McGill)
Chemist	-	N. Ahmad, D.I.C.T.A., A.I.C.T.A., M.Sc. (Br. Columbia) Ph.D.
Chemist	-	E.J.A. Khan, B.Sc. (Edin.) MSc. (Wales)
Chemist	-	Vacant
Agricultural Economist	-	Vacant
Economic Botanist	-	P.Poonai, D.I.C.T.A., A.I.C.T.A.
Fishery Officer (Research)	-	R.H. McConnell, D.Sc.
Honorary		
Fishery Officer (Research)	-	W.H.L. Allsopp, M.Sc. (Wis.) on secondment to Togoland.
Fishery Officer (Inland)	-	E.A. Shepherd
Soil Surveyor	-	Vacnat
3 Agricultural Officers	-	Vacant
Entomologist	-	C.P. Kennard, D.I.C.T.A., B.Sc. (McGill) M.Sc.
Plant Pathologist	-	Vacant
Curator	-	G.E. Wolstenholme
Senior Field Assistant (Meteorological)	-	J.E. Isaacs
Senior Field Assistant (Beekeeping Division)	-	A.E. Hu-A-Kem

VETERINARY AND ANIMAL HUSBANDRY

Assistant Director (Vet.)	-	E.M. McNett, D.V.M. (Ont.)
Veterinary Officer	-	P.F. Byrne, M.R.C.V.S. (Dub.)
Veterinary Officer	-	C.E.O. Fraser, B.V.Sc. M.R.C.V.S.
Veterinary Officer	-	P.S. Mongul, D.V.M.
Veterinary Officer	-	B.B.B. Persaud
Veterinary Officer	-	Vacant

FIELD AND EXTENSION

Assistant Director (Ext.)	-	E.I. Hugh, B.Sc., M.Sc., D.I.C.T.A., Dip. Agric. (Reading)
Agricultural Officer (Land Settlement and Development)	-	A.V. Wen-Ping, D.I.C.T.A., B.Sc. (Hon.) (McGill)
Agricultural Officer, East Demerara.	-	M.K. Rayman, D.I.C.T.A., (acting).

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Agricultural Officer, Berbice	-	C.B. Ching, B.A. M.Sc.
Agricultural Officer Essequibo	-	M. Ramnaraine, Dip. of Agric. (Wye)
Agricultural Officer, West Demerara	-	B.W. Carter, D.I.C.T.A.
Agricultural Officer (Grasslands)	-	G.D. Baxter, M.Sc.
Agricultural Officer (Perennial Crops)	-	H.V.S. Ho-a-Shu, D.I.C.T.A., A.I.C.T.A.
Agricultural Officer (Annual Crops)	-	M.W. Fisher, M.Sc.
Agricultural Officer (Performing duties of Agric. Engineer)	-	V.P. Chung, B.Sc. (Mech. Eng.) M.Sc. (Agric. Engineer).
Agricultural Officer (acting as Agricultural Economist).	-	A.R. Baburam, B.Sc. M.Sc.
Agricultural Engineer	-	Vacant - V.P. Chung, M.Sc (actg.)
Agricultural Assistant	-	L.H. Hope
Agricultural Assistant	-	C.K. Roberts, D.I.C.T.A.
Agricultural Assistant (Temp.)	-	B.H. Samaroo, D.I.C.T.A.
Agricultural Assistant	-	P.C. Jackson
Agricultural Assistant	-	J.A. Dummett.
Agricultural Assistant	-	A.V. Downer
Agricultural Assistant	-	W.A. Bovell
Agricultural Assistant	-	A.L. Agard
Senior Field Assistant	-	C.M. Shaw (seconded as Ag. Asst.)
Senior Field Assistant	-	A.K. Hu-A-Kam
Senior Field Assistant (Economics)	-	L.L. Rai, B.A. (Temp.)
Entomologist, Rice Storage Investigations	-	L.D. Cleare, F.R.E.S.
Sugar Agronomist	-	N.L. Davies, B.Sc. (Wales)

SENIOR ADMINISTRATIVE STAFF

Executive Officer		H.L. Morrison, (Actg.)
Accountant	-	G.W.S. Talbot
Assistant Accountant	-	C. Trotman
Assistant Accountant	-	H. Timla
Senior Woman Secretary	-	Miss M.M. Cheong/

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OFFICERS WORKING ON COLONIAL DEVELOPMENT SCHEME

Agronomist	-	R. Hewson, B.Sc., D.T.A.
Research Officer (Ebini)	-	S.P. Legg, B.Sc., M.A.
Agricultural Officer (Hoseroro Station).	-	D.E. Gollifer, B.Sc., Agric.
Agricultural Officer (St. Ignatius)	-	E. Cundiff, B.Sc. Dip. Agric.
Soil Surveyor	-	S.A. Harris, B.Sc, M.Sc.
Veterinary Officer (St. Ignatius)	-	G.D. Paine, M.R.C.V.S., Dip. T.V.M.
Farm Manager (St. Ignatius)	-	C.A. Vieira (on secondment to C.A.S.)
Farm Manager (Ebini)	-	C.C. Hennecart, Dip. Agric. (on secondment)

INTERNATIONAL CO-OPERATION ADMINISTRATION

Horticultural Specialist	-	J. Wheat, B.Sc.
Rural Credit Specialist	-	R.B. Gregg, B.Sc.
Vocational Agricultural Educational Specialist	-	A.C. Hale, B.S.A., M.Sc.
Rural Youth Specialist	-	Don P. Carter, B.Sc.
Fisheries Adviser	-	C.L. Kauffman.

UNITED NATIONS SOIL SURVEY STAFF

Project Manager	-	Thomas H. Day
Soil Chemist	-	Robert B. Cate (Jnr.)
Senior Soil Surveyor	-	Glen H. Robinson
Soil Surveyor	-	Robert Brinkman
Soil Surveyor	-	C.C. Applewhite
Photo Interpretation Specialist	-	Eitel H. Gross-Braun.